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JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

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THE SIXTY-NINTH ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN NEW ORLEANS, LA., SEPTEMBER, 1921

The 1921 meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in New Orleans during Convention Week

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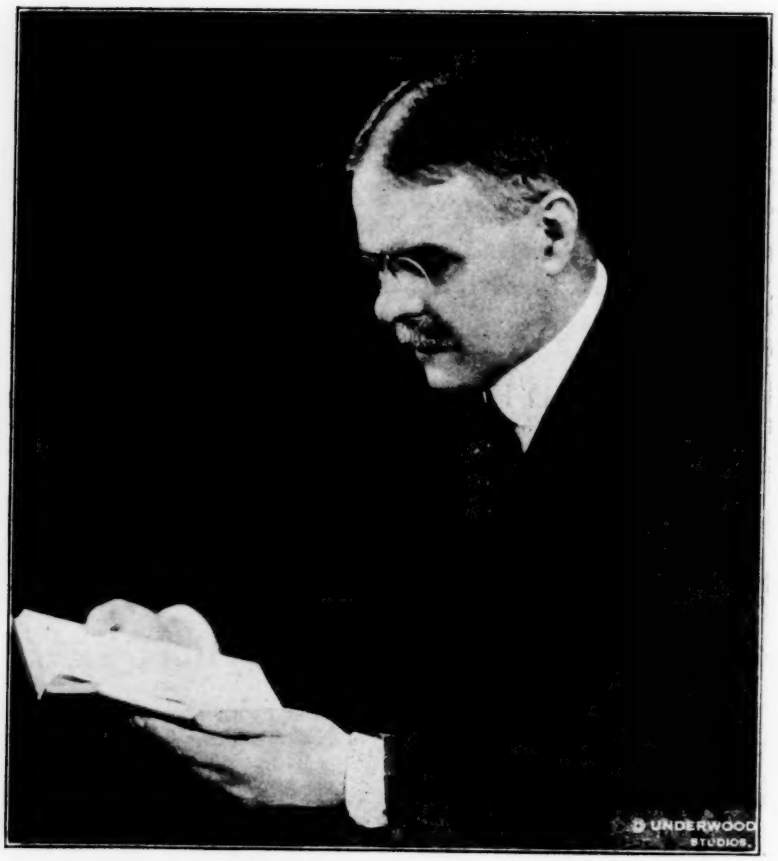

REID HUNT

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. IX OCTOBER 1920 NO. 10

REID HUNT.

Dr. Reid Hunt was elected president of the United States Pharmacopoeial Convention at the Centenary meeting. This marked his fiftieth anniversary (born Martinsville, Ohio, April 20, 1870); the first U. S. Pharmacopoeia was published fifty years prior (1820); he will preside at the first decennial convention of the second century in the history of the U. S. Pharmacopoeia. There seems to be a fifty-fifty historical relation, and while pharmacy cannot lay the same relative claims on Dr. Hunt with medicine, still as a youth his interest in medicine was developed while studying chemistry with the village druggist, and his later studies and investigations have held him in close touch with pharmacists and since 1904 he has been a member of the American Pharmaceutical Association, serving as Chairman of the Scientific Section in 1906–1907.

The period of his earlier education was followed by that in Johns Hopkins where he earned the degree of A.B., and later that of Ph.D. He then entered upon his medical studies, and was graduated from the College of Physicians and Surgeons, Baltimore (now a part of the University of Maryland) in 1896. Dr. Hunt was Fellow and Assistant in Physiology at Johns Hopkins, then Instructor in the Medical Department of Columbia University until his acceptance of an Associate Professorship of Pharmacology in the former institution. From 1902 to 1904 he worked in Frankfort, Germany, with the eminent pharmacologist, Dr. Paul Ehrlich, and returned to the United States during the latter year at the call of the Government, when he organized the Division of Pharmacology in the Hygienic Laboratory of the U. S. Public Health Service, of which he was the first Chief and Professor of Pharmacology.

In the preparation of the "Digest of Comments on the U. S. Pharmacopoeia" he had the coöperation of Dr. Murray Galt Motter, who, with the late Martin I. Wilbert, continued this valuable work, now under the direction of Dr. A. G. DuMez.

Dr. Hunt was a member of the last U. S. P. Revision Committee, and with his associates conducted a number of researches on the thyroid and suprarenal glands, bioassay of drugs, etc., the results of which were incorporated in U. S. P. IX. He is a foreign member of the Pharmaceutical Society of Antwerp, and in 1910 was a delegate to the International Congress on Pharmacy, convened in Brussels. He is co-author of "Non-Alkaloidal Organic Poisons" in Volume II of Peterson & Haines' "Textbook of Legal Medicine and Toxicology" and a contributor to Heffter's "Handbuch der Pharmakologie."

Since 1913 Dr. Reid Hunt has been Professor of Pharmacology at the Harvard University Medical School, and Consulting Pharmacologist to the Massachusetts State Department of Health. E. G. E.

EDITORIAL

E. G. EBERLE, Editor 253 Bourse Bldg., PHILADELPHIA

HIGHER ASSOCIATION DUES.

BY the time this number of the JOURNAL reaches the members of the American Pharmaceutical Association they will have expressed their views regarding the advance in annual Association dues. The same subject, for like reasons, is under consideration in Great Britain, and the increase in dues is the same as proposed in the referendum ballot sent out by the American Pharmaceutical Association. The necessity for larger annual assessments seems to be generally agreed to. Formal presentation of excuses and reasons for the contemplated advance was deemed superfluous; the issue should have been met several years ago. All the members are advised relative to the higher costs of publication; the question was simply one of determining the wishes of the members by vote, as to whether the Association should continue its publications and extend its services.

The JOURNAL is the product of the members, and so they are in position to value its publication. The Year Book, as the "Report on the Progress of Pharmacy" for many years, and thereafter as the annual volume, has proved its worth to pharmacists. The higher dues can hardly be considered in the light of an advance but, more reasonably, as an adjustment with the purchasing value of the dollar, and also with the higher cost level of publication and paper, which will not be materially abated for several years.

Doubtless, the question was carefully studied by the members and, therefore, the result of the vote will express their wishes for the guidance of the Council.

E. G. E.

THE ENFORCEMENT OF THE PROHIBITION LAW.

COMMISSIONER JOHN. F. KRAMER is quoted as saying that "we must have a healthy public sentiment to succeed with prohibition enforcement. * * * To what extent can a thousand men—that is the number we have—police 110,000,000 people?" Coincident with this statement is the announcement that a new official has been appointed to take charge of "the border department" of the prohibition squad, which looks after Texas, New Mexico and Arizona. That border is nearly 1,800 miles in length.

The liquor question is at present not one of rights or wrongs of the law; of the wisdom, or lack of it, in prohibition; but whether defiance of laws will be permitted, or whether they should be generally respected. The law-defying business is a cold-blooded proposition—to make money quickly.

It is said, Mr. Kramer has admitted, that some of his agents have fallen under suspicion of being disloyal to the law they were sworn to enforce. This may be true, for the temptations are great; those engaged in the unlawful business are in a position and willing to offer a big price for those who can offer temporary immunity against prosecution. The difficulties that beset the enforcement of the law are great, and the Commissioner and his force should be given every assistance possible; he certainly has the support of the drug trade.

The interest of pharmacists in the enforcement, aside from that as loyal citizens, is to keep the profession as clean and free as possible from those who would besmirch its good name. There is continued reflection in the public press which is unfair to druggists, for they have spoken in no uncertain terms of denouncement against those who are willing to engage in illegal liquor traffic, under the guise of dispensing it as medicine. E. G. E.

THE BUSINESS OF THE RETAIL PHARMACIST.

DURING the past few years the system of doing business, both in buying and selling, has in many respects differed from that in normal times. There was little resistance to the tendency toward higher prices, and not much complaint while every division shared in the profits. Retrenchment must be guarded and pessimism not mistaken for conservatism during the adjustment period now at hand. The inflation of prices was largely possible because the public, participating in the profits, was willing to pay the prices demanded. Now a spirit of organized resistance is developing, and we might as well face the facts, that prices will be brought down, and some of the indulgences we have more recently grown to believe were indispensable necessaries of life will again be transferred into the category of luxuries.

Most pharmacists are engaged in merchandizing, in fact, their greater volume of sales is derived from sundry articles, fountain beverages, etc., hence they will be affected by the scaling downward of prices and more conservative buying. The *New York Commercial*, in a recent editorial on the subject, said in part:

"There may be many who will assume that the retailers can afford to stand some loss because of large profits made in the past, which may seem plausible enough as a theory, but which is not sound from the economic standpoint. The assumption should be that so far as an active business is concerned, past profits represent money already expended. Any other theory would mean that no business man is sure of what he has already earned, and cannot invest it or spend it for fear that in some future period he may be called upon to pay some of it back to make up losses for that period.

"If, as in the present instance, there is a widespread revision of prices, it may result in failures and a general disruption of trade which will react upon the community at large. Naturally the attitude of retailers will be to sell the goods they have on hand or have contracted for at a price that will at least not show a loss.

They are going to find themselves in a difficult position, for they may not be able to maintain prices on any such basis. In any event, the ultimate consumer must not expect too much at the outset."

There was little scientific buying during the past four or five years; the time for its application is here, and under some handicaps of which those in the drug business are cognizant. With all of that, there is no justification for a period of commercial depression, as some would have us believe; the expanding business of the years referred to has been of such proportions that any reaction looms large by comparison. E. G. E.

OFFICE OF DEVELOPMENT WORK, BUREAU OF CHEMISTRY, U. S. DEPARTMENT OF AGRICULTURE.

ON his request, Dr. Carl L. Alsberg has been authorized to organize a new office in the Bureau of Chemistry which will link up science with industry and promises to extend the usefulness of the Bureau to the public. Discoveries in the laboratories have not been fully utilized, because the commercial possibilities were not presented to those in position to promote them.

A service is contemplated which will not only bring discoveries of the Bureau to the attention of investors, but inform manufacturers relative to the sources and availability of raw material supply needed in their manufactures, construction plans of plants and laboratories, improvements of machinery, costs of production and market demands for products. There is then the other important thought—industrial plants have after years of experience been successful in converting "waste" material into useful products, sometimes more valuable than that which first engaged the manufacturers. Such investigations will doubtless concern the new department and add materially to the productiveness of industries. The work for the present, it is stated, will be confined to discoveries originating in the Bureau. Though the chemist may be trained in the details of his profession, knows the value of his process or discovery, he is not always prepared "to launch them on the sea of business." This new office is to serve as such agency, and the opportunities which in the past have been neglected will be utilized and made productive. The move is one that promises great things for invention, science and business.

The Office of Development Work is organized under the direction of David J. Price, through whose activities in reducing grain dust explosions millions of dollars' worth of foodstuffs have been saved during the past few years. The Bureau of Chemistry has done potential work, and this is in line with the competency of those who have directed its affairs, and it is timely to say that they should receive more encouragement from the Government than they have been given. No department has served the people more competently and efficiently. E. G. E.

WORLD TRADE, PRODUCTION AND CONSUMPTION OF CRUDE BOTANICAL DRUGS.

THE U. S. Tariff Commission in a recent report discusses the probable future of American drug cultivation and in connection therewith the world trade, production and consumption of crude botanical drugs. Heretofore little attention has been given American crude drugs in these reports, and the one just issued is made interesting by the historical references, and valuable by listing imports, exports and prices of quite a number of foreign and domestic drugs. Parts of the report are quoted.

"The superstitious materia medica of the past reached out into unknown corners of the earth for unknown products which derived their chief value from the mystery of their origin. The search for drugs and spices was not the least of the spurs that led to the discovery of the New World. Thousands of plant species have had more or less medicinal vogue. Even now when scientific tests have discarded hosts of valueless medicinals, there is hardly a country which does not furnish some commercial medicinal supply.

"The domestic crude drug industry is of comparatively recent origin. Before the war a few native drugs, such as ginseng, cascara sagrada, and goldenseal, were grown on a commercial scale, but in general there was little or no competition between American crude drugs and those produced abroad. Foreign botanicals were not cultivated here either because of unsuitable climate or because our agriculture could not compete with wild or even cultivated materials produced elsewhere by the cheapest classes of labor.

"During the war renewed interest in drug cultivation was manifested in the allied countries. An especially notable feature was the rapid growth of the industry in Japan. There it has been fostered by very favorable climatic conditions, by cheap skilled agricultural labor, and, to some extent at least, by governmental aid. The newly founded Japanese chemical industries have also become prominent in the manufacture of a number of plant alkaloids and extracts. Present reports indicate that Japan in the future will be an important source of botanical drugs.

"In general, botanical drugs require a high degree of agricultural and technical skill and experience, valuable land, some special appliances, and a class of labor which is more expensive in this country than abroad. The industry is further limited by liability to insect and disease damage and by comparatively small demand. These exacting requirements have been met in the cases of certain drugs, such as belladonna and digitalis, and because of high prices and the absence of foreign competition their cultivation has been commercially successful."

The report urges that American industry be aided and consideration given to the advisability of promoting and continuing the cultivation of the indispensable drugs which have been successfully produced under American climatic, labor and economic conditions. It is pointed out that while the aggregate value of drug production is small, its importance to the public health cannot be overestimated; that the botanical drugs cannot be wholly replaced by synthetic medicinals, nor can their production be immediately stimulated and secured in emergency as is the case with most of the manufactured products. E. G. E.

SOME CONSTITUENTS OF ESSENTIAL OILS AND THEIR STRUCTURAL RELATIONS.

BY INGO W. D. HACKH.

One of the most interesting chapters of organic chemistry is that dealing with the constituents of essential oils. For an understanding of these odoriferous principles it is necessary to be familiar with their structure, and, unfortunately, our present system of structure formulas does not allow the author to make an extensive use of them, for they are not only extremely cumbersome to set into type, but also take too much space, and are therefore, as a rule, omitted from the ordinary textbook and dispensatory. Various makeshifts are sometimes employed to present the structure in a rational formula, but these are usually intelligible only to the initiate and meaningless to the less experienced student. At the same time the succession of C's and H's and O's with small and large numerals intermingled and connected by single and double lines, periods, commas, parentheses and bars, offer a splendid opportunity for the printer's devil and as a result there seems to be not a single textbook in which there is not at one place or another a mistake in the printed rational or structural formula.

The purpose of this paper is two-fold: first, to give an outline of the structural relation among the constituents of essential oils; and second, to illustrate by practical application the advantages of structure symbols, the new chemical notation of organic compounds, by which the responsibility of correctness of a structure is placed upon the author. Without structure symbols it would have taken at least eight to ten times more space to represent the 150 compounds of this paper. The structures of the majority of these compounds can hardly be found in the common textbooks, dispensatories or pharmacopoeia, but a knowledge of them is essential for an understanding of the similarities and differences among these compounds.

While at first sight the hieroglyphic characters of the structure symbols seem strange and difficult, they become, on second thought, quite intelligible, simple and more accurate than the conventional formula. No radical change is involved and no new theory or new conception of structure is developed, for the structure symbols are mainly a convenient geometrical device which eliminate the customary symbols C, H, O and N from the structure formula and represent the atoms of these elements by points from which one, two, three, or four lines, respectively, radiate. The key to the whole system is in the very simple diagram at the top of Plate 1. Wherever a line begins or terminates an atom of hydrogen stands, where two lines come together (an angle) oxygen is situated, where three (or five) lines radiate an atom of nitrogen is located, and where four lines come together or two lines cross an atom of carbon is placed.

Each organic compound belongs to a definite type and a definite class. The seven most important types are given in the second line of Plate 1. In these characteristic structure symbols a shaded circle indicates any radical. The first category of types are the hydrocarbons, which may be aliphatic or aromatic. Next come the alcohols and ethers, the aldehydes and ketones, the acids and esters—all are related to each other by having, respectively, one and two radicals (circles) attached; thus, in the ethers, ketones, and esters the hydrogen of the alco-

PLATE I

PLATE II

PLATE III

STRUCTURE SYMBOLS

hol, aldehyde, and acid is replaced by another organic radical (*e. g.*, methyl, ethyl, phenyl, etc.). The type of an organic compound is an indication of its chemical character and reactivity, while the class to which the compound belongs indicates its general structural characteristics. Saturated compounds contain no double bonds, unsaturated have one or more double bonds. Some compounds representative of classes are given at the lower part of Plate 1. Thus the relation of hexamethylene (13) to benzene (17) and the intermediate compounds (14, 15 or 16) is clearly seen, likewise the chemical name of menthane (18) as 1-methyl-4-isopropyl-hexamethylene. It will also be noticed that menthane (18), the mother substance of the terpenes, differs from camphane (19) in that in the first case the propyl group is outside the ring, and in the second case it is inside the ring; in other words, by swinging the isopropyl group 180° around the fourth carbon atom and connecting the eighth with the first carbon atom, a bridge in the hexamethylene ring is formed.

HYDROCARBONS.

The aliphatic hydrocarbons occurring in essential oils may be derived from octane (6 and 20). By attaching to the 2nd and 6th carbon atom a methyl group, 2,6-dimethyl-octane (21) is formed which contains one assymetric carbon atom, indicated by the dot in the structure symbol. An assymetric C atom is formed whenever the four valencies of C are connected to different groups, thus in 21 the sixth or assymetric carbon atom is connected on the left to the large group, on the right to ethyl, above to methyl, below to hydrogen. A double bond between the 2nd and 3rd C gives 2,6-dimethyl-Δ2-octene (22), where Δ indicates the position of the double bond in the now-accepted nomenclature. This compound likewise contains one assymetric C atom. A second double bond between the 5th and 6th C forms 2,6-dimethyl-Δ2,5-octa-diene (23), in which the sixth C atom is no more assymetric, as it is connected by two valencies to the fifth. A third double bond placed between the 7th and 8th C gives Ocymene (24), which occurs in some essential oils and is isomeric with other aliphatic hydrocarbons occurring in essential oils. The relation of this hydrocarbon is graphically shown in the structure symbols 24, 25, 26 and 27; thus, if the fourth CH_2 group is shown by a heavier line (*c*), and the two methyl groups are marked *a* and *b*, then by connecting *a* with *c* pseudocymene (24) is formed, *b* with *c* gives myrcene (25), and *a* and *b* with *c* gives pseudomyrcene (26). By this turning movement of the double bond various isomeric compounds can be explained, *e. g.*, 30 and 34, 31 and 35, 38 and 42, etc.

Ring formation usually takes place by attaching the first to the sixth carbon atom, thus may be derived from the compound 21: menthane (84), from 22: Δ4(8)-terpene (89), from 23: terpinolene (91), and from 24: Δ2,6,4(8)-cymene. Such ring compounds may be monocyclic (terpene group) or dicyclic (camphene group). To the first group belong the following compounds:

Terpanes, $C_{10}H_{20}$, the most common representative is menthane (84) or para-terpane. The methyl and isopropyl group may also be in the meta-position: *m*-terpane (120), and ortho-position: *o*-terpane, of which 125 is a derivative.

Terpenes, $C_{10}H_{18}$, derived from the terpanes by having a double bond, which may be variously located, either inside the ring (85, 86, 87), or between the ring and the methyl carbon atom (88) or the isopropyl-carbon atom (89), or it may

be outside the ring (90). The more prominent representatives of this group are carvomenthene (85) and menthene (87).

Terpadienes, $C_{10}H_{16}$, contain two double bonds which may be located in 20 different ways relative to each other; only four different positions are shown by the symbols 91, 92, 93 and 96, representing terpinolene, phellandrene, limonene, and pseudophellandrene. Of limonene the dextro-rotatory (94) and laevo-rotatory (95) as well as the inactive (93) varieties are shown.

Terpatrienes, $C_{10}H_{14}$, contain three double bonds, of which the most common one is cymene (97). The other possibilities with three double bonds are $\Delta 2,4,6$, $\Delta 2,5,1(7)$, $\Delta 2,4,1(7)$, $\Delta 2,1(7),4(8)$, $\Delta 2,1(7),8(9)$, and $\Delta 2,1(7),8(10)$. Of terpatetraenes, containing four double bonds, there are the two possibilities $\Delta 1,3,5,8(9)$-methyl-propenyl-benzene, and $\Delta 2,5,1(7),4(8)$, which resembles the quinone type.

To the second group the dicyclic compounds belong:

Camphanes, $C_{10}H_{18}$, in which the bridge may connect the first and fourth (133), second and fifth (134), second and fourth (135), third and fourth (136) carbon atom. Of these fenchane (134) is structurally related to *m*-terpane (120) in the same way as camphane (133) is to *p*-terpane (84).

Camphenes, $C_{10}H_{16}$, is a very important class containing a double bond which may be located between the 1st and 7th carbon atom of 134 = alpha-fenchene (138), or 135 = camphene (139), or between the 6th and 1st C atom of 134 = beta-fenchene (141), or of 135 = pinene (142), or of 136 = carene (143), or it may be located between the 5th and 6th C of 133 = bornylene (140), or finally between the 4th and 5th C of 133 = camphanene (144).

A transition between the monocyclic and dicyclic compounds is formed by thujene (126, 127) and sabinene (128), which differ by a different position of the double bond as shown in the structure symbols.

ALCOHOLS AND PHENOLS.

Both types, alcohols and phenols, contain the OH group, which in the latter case is attached to a benzene ring. The uniform ending of these compounds is -OL. Of aliphatic alcohols occurring in essential oils there is octyl alcohol (28), derived from octane (20), rhodinol (30), derived from 22, citronellol (33, 34), derived from 30 by swinging the double bond from the third to the first carbon atom. Of citronellol, the laevo- and dextro-rotatory form is given. Geraniol (31) is derived from 23, and nerol (35) from geraniol by swinging the double bond again. Linalool (32) has the OH group attached to the sixth carbon atom and is thus a tertiary alcohol.

Phenols of importance are phenol (48), anol (49), chavicol (50), charvacrol (51), thymol (52), and methyl-thymol (53). Anol differs from chavicol by attaching the first resp. the second carbon atom of the propenyl group to the benzene ring. Charvacrol differs from thymol, in the position of the hydroxy group, as clearly illustrated in the structure symbol.

Terpanols, $C_{10}H_{20}O$, or monocyclic alcohols of the terpane group contain one hydroxy group which may be located on any of the ten carbon atoms of menthane (84). The most important one is terpan-ol-3 or menthol (99) where the OH group is attached to the third carbon atom.

Terpan-diols, $C_{10}H_{20}O_2$, contain two hydroxy groups of which terpin or terpinol (101, 102) is a representative.

Terpenols, $C_{10}H_{18}O$, are derived from the terpenes and contain one double bond and one hydroxy group. Only three (103, 104, 105) terpenols are given, but from each of the seven terpenes there are nine terpenols, together 49 compounds, possible.

Terpadiene-ols, $C_{10}H_{16}O$, contain two double bonds and one hydroxy group of which there are about 180 possibilities, but the more important ones are pulegol (106) and carveol (108).

Campholes, $C_{10}H_{18}O$, or dicyclic alcohols of the camphane and camphene type are also quite numerous. The more important ones are borneol (146) or borneo-camphor and isoborneol (145), and cineol (150) (eucalyptol, cajeputol) which would belong, strictly speaking, to the ethers.

ETHERS.

The ethers occurring in essential oils belong mainly to the phenyl-ethyl-ether type. Thus anisol (54) or methoxy-benzene is the first representative. Anethol (55) and methyl-chavicol (56) contain the propenyl group. Methyl-eugenol (57) and methyl-isoeugenol (58) contain two methoxy groups, while asarol (59) contains three methoxy groups. Hesperitol (60) contains one methoxy and one hydroxy group, while eugenol (62), isoeugenol (63), chavibetol (64), and betelphenol (65) are all isomeric compounds. Two neighboring methoxy groups attached to the benzene ring may form a secondary pentacycle, thus if in 57 the second methoxy group swings around, and eliminating methane, the structure of safrol (78) a methylene-ether is formed. Isosafrol (79) differs by the attachment of the propenyl group, and myristicine (80) contains another methoxy group, while apiol (81) and iso-apiol (82) contain two additional methoxy groups.

ALDEHYDES.

The aldehydes, like the alcohols, occurring in essential oils, may be aliphatic or aromatic. To the first class belong citronellal (38, 41, 42) and geranial (39, 40, 43), which are derived, respectively, from citronellol (33, 34) and geraniol (31). Of citronellal two forms are possible, the terpinolene form (derived from rhodinol (30)) and the limonene form (derived from 33, 34). Both may be dextro- or laevo-rotatory. Geranial, while not containing an assymetric carbon atom may be of the cis- and trans-type, that is, the methyl group may exchange places with the aldehyde group as shown in structure symbol 39 and 40.

Aromatic aldehydes are derived from benzaldehyde (66). If to benzaldehyde there is attached one hydroxy group in the ortho position: salicyl aldehyde (67); one methoxy group in the para position; anisyl aldehyde (68) or anisic aldehyde; if both: vanillin (69); two methoxy groups: methyl-vanillin (70). Cumic aldehyde (71) is *p*-iso-propylbenzene, and Cinnamaldehyde (72, 73) is phenyl-acryl-aldehyde of which exists a trans- (73) and cis- (74) type. Piperonal or heliotropin (83) is the methylene ether of benzaldehyde.

KETONES.

Aliphatic ketones are amyl-methyl-ketone (44) and nonyl-methyl-ketone (45), a derivative of the latter is pseudo-ionone (47) which contains two methyl groups and three double bonds. Ionone (74, 75) and Irone (76) are monocyclic methyl-ketones which differ in the position of the double bond.

Terpan-ones, $C_{10}H_{18}O$, are saturated monocyclic ketones derived from terpane. Thus menthone (113) and tetrahydrocarvone (112) are the more prominent representatives.

Terpen-ones, $C_{10}H_{14}O$, are unsaturated monocyclic ketones containing one double bond of which there are about 18 possibilities. The more important ones are pulegone (115), isopulegone (118), carvotanacetone (116), and dihydrocarvone (117).

Terpadiene-ones, $C_{10}H_{12}O$, contain, as the name indicates, two double bonds, of which there are 12 possibilities. Carvone (119) is terpadiene-one-2 and derived from terpine (91).

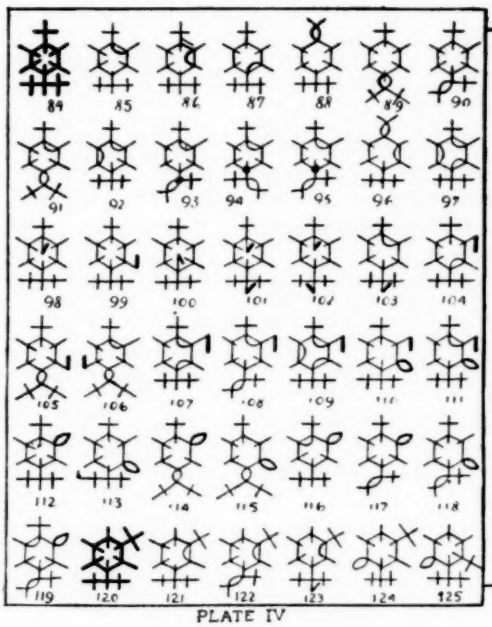

PLATE IV

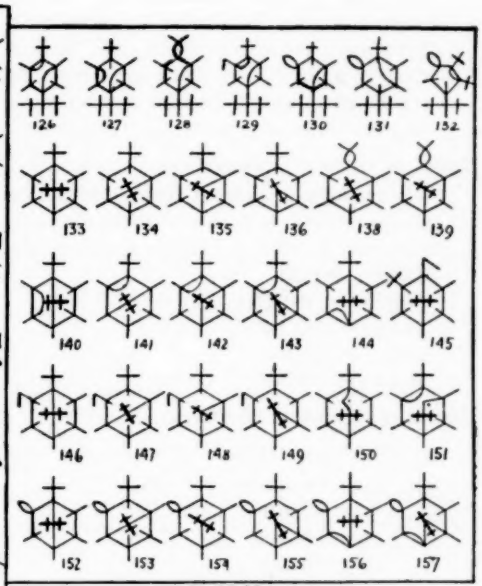

PLATE V

STRUCTURE SYMBOLS.

Camphones, $C_{10}H_{16}O$, or camphors, are dicyclic ketones derived from camphane and camphene. Most prominent is camphor (152) or laurel camphor, less in importance are fenchone (153), pinone (154), camphenone (156) which can be derived from 144. In Plate 5 these compounds are so arranged that the corresponding hydrocarbons, alcohols and ketones are placed under each other, as far as this is possible. Thus, in the first four columns there are the corresponding series: 133, 140, 146, 152, 133–140–146–152, 134–141–147–153, 135–142–148–154 and 136–143–149–155, while 144–156 are similarly related.

A comparative study of these tables will undoubtedly be of profit, for it is possible by the use of structure symbols to arrange the compounds in such a way that their similarity and difference can be exposed, which is not possible by using the conventional structure formula, for then one has to read every symbol and letter. The arrangement of the tables is such that from the simple the more complex structure has been derived—some of the characteristic differences have been marked by a heavier type.

The structure symbols are at present still in the experimental stage, but the writer has already compiled a classified list of over 2,000 organic compounds and in so doing he came to the belief that the structure symbols have advantages which are unsurpassed by the conventional formula. In overcoming the initial inconvenience of understanding and using these characters by practical use and application in class-room work and study, much benefit is gained and the conception of organic chemistry and the structures of their compounds greatly facilitated.

PLATE I.

Key to Structure Symbols:

Hydrogen, a point from which one line radiates.
Oxygen, a point from which two lines radiate.
Nitrogen, a point from which three lines radiate.
Carbon, a point from which four lines radiate.
The substances whose structure symbols are shown are:
hydrogen-gas (H_2), water (H_2O), ammonia (NH_3), methane (CH_4).

Types of Organic Compounds:

There are seven important types of organic compounds:
Hydrocarbons, R-H, where R (shaded circle) is any radical.
Alcohols, R-OH and Phenols, if R is a benzene ring.
Ethers, R-O-R.
Aldehydes, R-CHO.
Ketones, R-CO-R.
Acids, R-COOH.
Esters, R-COO-R.

Classes of Organic Compounds:

A. Saturated Aliphatic Compounds:

1 = methane CH_4
2 = ethane C_2H_6
3 = propane C_3H_8
4 = butane C_4H_{10}
5 = isobutane C_4H_{10}
. . . . .
6 = octane C_8H_{18}

B. Unsaturated Aliphatic Compounds:

7 = ethine, acetylen C_2H_4
8 = propine C_3H_6
9 = butine C_4H_8
10 = trans-$\Delta 2$-butine C_4H_8
11 = cis-$\Delta 2$-butine C_4H_8
12 = 2-methyl-propine C_4H_8

C. Saturated Aromatic Compounds:

13 = hexamethylene, hexahydrobenzene C_6H_{12}
18 = menthane, 1-methyl-4-isopropyl-hexamethylene $C_{10}H_{20}$
19 = camphane, 1-methyl-1(4)-isopropylene-hexamethylene $C_{10}H_{18}$

D. Unsaturated Aromatic Compounds:

14 = tetrahydro-benzene C_6H_{10}
15 = 4,5-dihydro-benzene C_6H_8
16 = 2,5-dihydro-benzene C_6H_8
17 = benzene C_6H_6

PLATE 2.

Aliphatic Hydrocarbons, Alcohols, Aldehydes, and Ketones.

Hydrocarbons:

20. C_8H_{18} = Octane
21. $C_{10}H_{22}$ = 2,6-dimethyl-octane
22. $C_{10}H_{20}$ = 2,6-dimethyl-octene-2
23. $C_{10}H_{18}$ = 2,6-dimethyl-octa-diene-2,6
24. $C_{10}H_{16}$ = Ocymene, 2,6-dimethyl-octa-triene,2,5,7
25. = Pseudocymene, 2,6-dimethyl-octa-triene-1,5,7
26. = Myrcene, 2-methyl-6-vinyl-hepta-diene-2,5
27. = Pseudomyrcene, 2-methyl-6-vinyl-hepta-diene-1,5

Alcohols:

28. $C_8H_{18}O$ = Octyl-alcohol, octan-ol-1 or octan-ol-8
29. $C_{10}H_{22}O$ = 2,6-dimethyl-octan-ol-8
30. $C_{10}H_{20}O$ = Rhodinol, 2,6-dimethyl-octene-2-ol-8
33. = 1-Citronellol, 2,6-dimethyl-octane-1-ol-8
34. = d-Citronellol, 2,6-dimethyl-octane-1-ol-8
31. $C_{10}H_{18}O$ = Geraniol, 2,6-dimethyl-octa-diene-2,6-ol-8
32. = Linalool, 2,6-dimethyl-octa-diene,2,7-ol-6
35. = Nerol, 2,6-dimethyl-octa-diene-2,6-ol-8

Aldehydes:

36. $C_8H_{16}O$ = Heptyl-aldehyde, octanal
37. $C_{10}H_{20}O$ = 2,6-dimethyl-heptyl-aldehyde
38. $C_{10}H_{18}O$ = Citronellal (terpinolene form)
41. = Citronellal (limonene form) laevo-
42. = Citronellal (limonene form) dextro-
39. $C_{10}H_{16}O$ = Geranial (terpinolene form) trans-
40. = Geranial (terpinolene form) cis-
43. = Geranial (limonene form)

Ketones:

44. $C_7H_{14}O$ = Amyl-methyl-ketone, hepten-one-2
45. $C_{11}H_{22}O$ = Nonyl-methyl-ketone, Undecan-one-2
46. $C_{13}H_{22}O$ = 2,6-dimethyl-nona-diene-2,6-methyl-ketone
47. $C_{13}H_{20}O$ = Pseudoionone, 2,6-dimethyl-nona-triene-2,6,8-methylketone

PLATE 3.

Aromatic Phenols, Ethers, Aldehydes, and Ketones.

Phenols:

48. C_6H_6O = Phenol, hydroxy-benzene
49. $C_9H_{10}O$ = Anol, *p*-propenyl-phenol, 1-hydroxy-4-propenyl-benzene
50. $C_9H_{10}O$ = Chavicol, *p*-allyl-phenol, 1-hydroxy-4-allyl-benzene
51. $C_{10}H_{14}O$ = Charvacol, 1-methyl-2-hydroxy-4-isopropyl-benzene
52. $C_{10}H_{14}O$ = Thymol, 1-methyl-3-hydroxy-4-isopropyl-benzene, thyme camphor
53. $C_{10}H_{14}O$ = Methyl-thymol, 1,6-dimethyl-3-hydroxy-4-isopropyl-benzene

Ethers:

54. C_7H_8O = Anisol, methyl-phenyl-ether, methoxy-benzene
55. $C_{10}H_{12}O$ = Anethol, *p*-propenyl-anisol, 1-methoxy-4-propenyl-benzene
56. $C_{10}H_{12}O$ = Methyl-chavicol, *p*-isopropyl-benzene, 1-methoxy-4-allyl-benzene
57. $C_{11}H_{14}O_2$ = Methyl-isoeugenol, 1,2-dimethoxy-4-propenyl-benzene
58. $C_{11}H_{14}O_2$ = Methyl-eugenol, 1,2-dimethoxy-4-allyl-benzene
59. $C_{12}H_{16}O_3$ = Asarol, 1,2,5-trimethoxy-allyl-benzene

Phenolic Ethers:

60. $C_9H_{10}O_2$ = Hesperitol, 1-methoxy-2-hydroxy-4-vinyl-benzene
61. $C_9H_{10}O_2$ = Isohesperitol, 1-hydroxy-2-methoxy-4-vinyl-benzene

62. $C_{10}H_{12}O_2$ = Eugenol, 1-methoxy-2-hydroxy-4-allyl-benzene
63. $C_{10}H_{12}O_2$ = Isoeugenol, 1-methoxy-2-hydroxy-4-propenyl-benzene
64. $C_{10}H_{12}O_2$ = Chavibetol, 1-hydroxy-2-methoxy-4-allyl-benzene
65. $C_{10}H_{12}O_2$ = Betelphenol, 1-hydroxy-2-methoxy-4-propenyl-benzene

Aldehydes:

66. C_7H_6O = Benzaldehyde
67. $C_7H_7O_2$ = Salicylaldehyde, *o*-hydroxy-benzaldehyde
68. $C_8H_8O_2$ = Anisaldehyde, *p*-methoxy-benzaldehyde, anisic aldehyde
69. $C_8H_8O_3$ = Vanillin, 3-methoxy-4-hydroxy-benzaldehyde
70. $C_9H_{10}O_3$ = Methyl-vanillin, 3,4-dimethoxy-benzaldehyde
71. $C_{10}H_{12}O$ = Cumic aldehyde, *p*-isopropyl-benzaldehyde
72. C_9H_8O = cis-Cinnamic aldehyde, cis-cinnamaldehyde
73. C_9H_8O = trans-Cinnamic aldehyde, trans-cinnamaldehyde
74. $C_{13}H_{20}O$ = beta-Ionone
75. $C_{13}H_{20}O$ = alpha-Ionone
76. $C_{13}H_{20}O$ = Irone
77. $C_9H_6O_2$ = Coumarine, *a*-benzopyrone

Methylene-ethers:

78. $C_{10}H_{10}O_2$ = Safrol, shikimol, 1,2-methylenedioxy-4-allyl-benzene
79. $C_{10}H_{10}O_2$ = Isosafrol, 1,2-methylenedioxy-4-propenyl-benzene
80. $C_{11}H_{12}O_3$ = Myristicin, 1,2-methylenedioxy-5-methoxy-4-propenyl-benzene
81. $C_{12}H_{14}O_4$ = Apiol, 1,2-methylenedioxy-5,6-dimethoxy-4-propenyl-benzene
82. $C_{12}H_{14}O_4$ = Isoapiol, 1,2-methylenedioxy-5,6-dimethoxy-4-allyl-benzene
83. $C_8H_6O_2$ = Piperonal, Heliotropin, 3,4-dioxy-methylene-benzaldehyde

PLATE 4.

Monocyclic Compounds: Terpene-group.

A. Saturated Hydrocarbons: *Terpanes:*

84. $C_{10}H_{20}$ = Menthane, *p*-terpane, hexahydrocymene, menthonaphthene.

B. Unsaturated Hydrocarbons, 1 Δ, *Terpenes:*

85. $C_{10}H_{18}$ = 1-Terpene, carbomethene
86. $C_{10}H_{18}$ = 2-Terpene
87. $C_{10}H_{18}$ = 3-Terpene, menthane
88. $C_{10}H_{18}$ = 1(7)-Terpene
89. $C_{10}H_{18}$ = 4(8)-Terpene
90. $C_{10}H_{18}$ = 8(9)-Terpene

2 Δ, *Terpadienes:*

91. $C_{10}H_{16}$ = 1,4(8)-terpadiene, perpinolene, terpinene
92. $C_{10}H_{16}$ = 1,5-terpadiene, phellandrene
93. $C_{10}H_{16}$ = 1,8(9)-terpadiene, *i*-limonene
94. $C_{10}H_{16}$ = 1,8(9)-terpadiene, *d*-limonene
95. $C_{10}H_{16}$ = 1,8(19)-terpadiene, *l*-limonene
96. $C_{10}H_{16}$ = 2,1(7)-terpadiene, pseudophellandrene

3 Δ, *Cymenes:*

97. $C_{10}H_{14}$ = Cymene, 1-methyl-4-isopropyl-benzene

A. Saturated Alcohols, 1(OH), *Terpan-ols:*

98. $C_{10}H_{20}O$ = Terpan-ol-1
99. $C_{10}H_{20}O$ = Terpan-ol-3, menthol, mint-camphor
100. $C_{10}H_{20}O$ = Terpan-ol-4, tertiary-menthol

2(OH), *Terpan-diols:*

101. $C_{10}H_{20}O_2$ = Terpan-diol-1.8, cis-terpin, cis-terpinol
102. $C_{10}H_{20}O_2$ = Terpan-diol-1.8, trans-terpin, trans-terpinol

B. Unsaturated Alcohols, 1 Δ, 1(OH), *Terpen-ols:*

103. $C_{10}H_{18}O$ = 1-terpen-ol-8, terpineol
104. $C_{10}H_{18}O$ = 3-terpen-ol-2, tetrahydro-carvacol
105. $C_{10}H_{18}O$ = 4(8)-terpen-ol-3, dihydro-pulegol

2 Δ, 1(OH), *Terpadiene-ols:*

106. $C_{10}H_{16}O$ = 1,4(8)-terpadiene-ol-5, pulegol
107. $C_{10}H_{16}O$ = 1,3-terpadiene-ol-2, dihydrocarvacol
108. $C_{10}H_{16}O$ = 1,8(9)-terpadiene-ol-2, carveol

3 Δ, 1(OH), *Cymols:*

109. $C_{10}H_{14}O$ = carvacol, 2-cymol

Alcohols and Ketones:

110. $C_{10}H_{18}O_2$ = Menthanol, 1-methyl-4-isopropyl-cyclohexanone-3-ol-2
111. $C_{10}H_{16}O_2$ = Buchu-camphor, 1-methyl-4-isopropyl-cyclohexene-1-one-3-ol-2

A. Saturated Ketones—*Terpan-ones:*

112. $C_{10}H_{18}O$ = terpan-one-2, tetrahydrocarvone
113. $C_{10}H_{18}O$ = terpan-one-3, menthone

B. Unsaturated Ketones—1 Δ, *Terpenones:*

114. $C_{10}H_{14}O$ = 4(8)-terpen-one-2
115. $C_{10}H_{14}O$ = 4(8)-terpen-one-3, pulegone
116. $C_{10}H_{14}O$ = 6-terpen-one-2, carvotanacetone
117. $C_{10}H_{14}O$ = 8(9)-terpen-one-2, dihydrocarvone
118. $C_{10}H_{14}O$ = 8(9)-terpen-one-3, isopulegone

2 Δ, *Terpadiene-ones:*

119. $C_{10}H_{12}O$ = 6,8(9)-terpadiene-one-2, carvone

Meta- and Para-Terpanes and Derivatives:

120. $C_{10}H_{20}$ = *m*-terpane, *m*-menthane
121. $C_{10}H_{18}$ = 1-*m*-terpene, carvestrene
122. $C_{10}H_{16}$ = 1,(9)-*m*-terpadiene, sylvestrene
123. $C_{10}H_{18}O$ = 1-meta-terpen-ol-8, carvestrol, 1-meta-menthenol
124. $C_{10}H_{18}O$ = meta-terpenone-4, *m*-menthone
125. $C_{10}H_{18}O$ = ortho-terpenone-3, *o*-menthone

PLATE 5.

Transition from Monocyclic to Dicyclic Compounds:

126. $C_{10}H_{16}$ = alpha-thujene, 2(4),6-terpadiene
127. $C_{10}H_{16}$ = beta-thujene, 2(4),5-terpadiene
128. $C_{10}H_{16}$ = sabinene, 2(4),1(7)-terpadiene
129. $C_{10}H_{16}O$ = a-thujol, 2(4),6-terpadiene-ol-5, thujyl alcohol
130. $C_{10}H_{16}O$ = a-thujone, 2(4)-terpen-one-5
131. $C_{10}H_{16}O$ = b-thujone, 1(3)-terpen-one-5
132. $C_{10}H_{16}O$ = isothujone

Dicyclic Compounds: Camphene Group.

Saturated Hydrocarbons—*anes:*

133. $C_{10}H_{18}$ = Camphane, 1,7,7-trimethyl-bicyclo(1,2,2)heptane
134. $C_{10}H_{18}$ = Fenchane, 2,7,7-trimethyl-bicyclo(1,2,2)heptane
135. $C_{10}H_{18}$ = Pinane, 2,7,7-trimethyl-bicyclo(1,1,3)heptane
136. $C_{10}H_{18}$ = Carane, 3,7,7-trimethyl-bicyclo(o,1,4)heptane

Unsaturated Hydrocarbons—*enes:*

138. $C_{10}H_{16}$ = a-Fenchene
139. $C_{10}H_{16}$ = Camphene
140. $C_{10}H_{16}$ = Bornylene, Borneo-camphor
141. $C_{12}H_{16}$ = b-Fenchene

142. $C_{10}H_{16}$ = Peinne
143. $C_{10}H_{16}$ = Carene
144. $C_{10}H_{16}$ = Camphanene

Alcohols—*oles:*

145. $C_{10}H_{18}O$ = Isoborneol
146. $C_{10}H_{18}O$ = Borneol, Borneo-camphor
147. $C_{10}H_{18}O$ = Fenchol
148. $C_{10}H_{18}O$ = Pinol
149. $C_{10}H_{18}O$ = Carol
150. $C_{10}H_{18}O$ = Cineol, Eucalyptol, Cajeputol
151. $C_{10}H_{18}O$ = Subrerol

Ketones—*ones:*

152. $C_{10}H_{16}O$ = Camphor, laurel camphor
153. $C_{10}H_{16}O$ = Fenchone
154. $C_{10}H_{16}O$ = Pinone
155. $C_{10}H_{16}O$ = Carone
156. $C_{10}H_{16}O$ = Camphenone
157. $C_{10}H_{16}O$ = Eucarone

COLLEGE OF PHYSICIANS AND SURGEONS,
SAN FRANCISCO, CAL.

PURITY STANDARDS FOR ABSORBENT COTTON.

BY A. WAYNE CLARK, R. O. SMITH AND LEROY FORMAN.

Prior to the work of one of us during the years 1909 to 1911 on extraction methods, etc., for impurities in absorbent cotton, little or no work appears to have been done on the subject and no standards suggested. The U. S. Pharmacopoeia VIII, then official, contains only rough standards for absorbency, for acid or alkali and for ash.

Tentative standards used for manufacturing control came into use during the above period. These were published in a monograph issued from this laboratory (1912).

METHOD OF TESTING ABSORBENT COTTON LABORATORY NOTES No. 1, 1912.

Acid or Alkali.—Ten grammes of sample are saturated with 100 Cc. neutral distilled water, the water pressed out and divided into two portions, each of which is placed in a white porcelain dish. To one portion is added three drops phenolphthalein test solution, and to the other portion one drop methyl orange test solution. Neither portion should develop any pink color.

Ash.—Five grammes, on incineration in a weighed platinum crucible, should leave not more than 0.2 percent ash.

Oil and Fatty Matter.—Extract 20 grammes of sample in a narrow percolator with ether until 200 Cc. percolate is secured. The percolate, on evaporation to dryness in a weighed beaker, should leave not more than 0.5 percent residue. A blank test should be made with an equal quantity of the ether used.

Coloring Matter Resins and Soap.—Extract 20 grammes of sample in a narrow percolator with alcohol until 200 Cc. percolate is secured. The percolate should not be of a greenish or bluish tint, and on evaporation to dryness in a weighed beaker should leave not more than 0.5 percent residue. A blank test should be made with an equal quantity of the alcohol used.

Water-soluble Salts and Soap.—Extract 20 grammes of sample in a narrow percolator, with hot distilled water (80° to 90° C.) until 200 Cc. percolate is secured. The percolate should

not be cloudy—if it is so, soap is present, which should not be the case. The percolate on evaporation to dryness in a weighed beaker should leave not more than 0.2 percent residue. A blank test should be made with an equal quantity of the water used.

These standards and methods continued in use in this laboratory until the publication of the U. S. P. IX, in the year 1916, which then, of course, became official, and which contained a method like in purpose and very similar in procedure to that of the 1912 publication.

Obviously, extraction methods of the Soxhlet type are the only correct chemical procedure for accurate work of this character, and in attempting to promulgate simple percolation methods, the original workers in this laboratory were well aware that they lacked completeness. They were written into the standard method because of their simplicity so that they might be applied in laboratories of very modest equipment and for workers of moderate ability.

METHOD OF TESTING ABSORBENT COTTON U. S. P. IX (1916).

When Purified Cotton, previously compressed in the hand, is thrown on the surface of cold water, it readily absorbs the latter and sinks.

Incinerate 5 Gm. of Purified Cotton; not more than 0.2 percent of ash remains.

Thoroughly saturate about 10 Gm. of Purified Cotton with 100 mils of distilled water, then with the aid of a glass rod press out two portions of the water, 25 mils each, into white porcelain dishes. Add to one portion 3 drops of phenolphthalein T. S. and to the other portion 1 drop of methyl orange T. S.; no pink color develops in either portion (alkali or acid).

Extract 5 Gm. of Purified Cotton, tightly packed in a narrow percolator with ether, until the percolate measures 20 mils, and evaporate this to dryness; the residue does not exceed 0.6 percent (fatty matter).

Extract 10 Gm. of Purified Cotton, in a narrow percolator with alcohol until the percolate measures 100 mils. When observed downward through a column 20 cm. in depth, the percolate may show a yellowish color, but no blue or green tint (dyes); and on evaporating this percolate to dryness, the weight of the residue does not exceed 0.5 percent (resins and soap).

The tests given in U. S. P. IX appear to be an abridged assembly of the methods suggested in the foregoing, the amounts of solvents used in extraction being reduced to so small a quantity as practically to destroy the value of the method. (Criticism of the U. S. P. IX text was undertaken in a later issue of the publication referred to (1920).)

Immediately on the outbreak of the World War the medical branches of the military were called upon to secure surgical supplies, including absorbent cotton, in quantities and at a speed never before considered. Both the U. S. Army and the Navy adopted specifications for surgical dressing material, unfortunately not alike.

The following are the U. S. Army specifications for purity of absorbent cotton:

U. S. ARMY SPECIFICATIONS FOR SURGICAL ABSORBENT COTTON.

Reaction.—An aqueous extract obtained by boiling 50 Gm. of cotton in 500 mils of distilled water for 5 minutes, the water drained from the cotton to a volume of 100 mils, cooled and divided into two equal parts, the one shall be neutral to phenolphthalein, the other to two drops of methyl orange T. S.

Soluble Coloring Matters and Impurities.—A full layer of cotton, not less than 6 × 6 inches square, is carefully placed on the surface of distilled water contained in a white porcelain dish and allowed to slowly sink therein. The water rises through the mass of cotton, but no coloration or dirt must be observable at the moment it reaches the surface of the latter.

Absorbency.—Five (5) grammes contained in a small wire basket weighing not over 3 grammes, placed on the surface of distilled water at 25° C., shall be completely submerged in 30 seconds; and upon removing it from the water, allowing it to drain 10 seconds, not less than 120 grammes of water shall have been absorbed.

Moisture.—Ten (10) grammes dried at a temperature of 105° C. for three hours shall not lose more than 5 percent in weight.

Ash.—On incineration of 10 grammes in a platinum crucible it shall yield not more than 0.2 percent of ash.

Extractive Matters; Water.—An aqueous extract obtained in the same manner as for the reaction shall show no reaction for stearic acid, starch, dextrin or other foreign substances.

Twenty (20) grammes boiled in 500 mils of distilled water for one-half hour, the volume of liquid maintained by addition of boiling distilled water, the water pressed out and the cotton rinsed twice with 250 mil portions of distilled water, the total volume evaporated to dryness in a platinum dish, then kept at 100° C. until constant in weight, shall yield a residue of not more than 0.2 percent.

Alcohol and Ether.—Separate portions of 20 grammes, extracted with 95 percent alcohol and ether, respectively, in a Soxhlet extractor, for five (5) hours, shall yield a solution having no blue, green or brownish color, which, when evaporated and dried to constant weight at 100° C., shall yield a solid extract of not more than 0.55 percent in each.

The purpose of this paper is to summarize the situation. The several methods that have been used have left the matter in a tangled state. The text of the U. S. P. IX is very unsatisfactory.

The enormous number of tests made during the war gave us much additional information. Running concurrently with the cotton tests, there were standard Army tests for purity of absorbent gauze. This material is simply absorbent cotton in cloth form and there is no inherent reason why the procedure of testing should be decidedly different. During the war period the Army water extraction method required for gauze was with the Soxhlet extractor under a reflux condenser run for six hours, whereas it will be observed that the method for cotton was quite different. Upon this we have expended considerable experimental work and we here take up our critical examination in detail, as follows:

DEGREE OF ABSORBENCY.

We find ourselves unable to formulate a satisfactory method for testing this most important quality of absorbent cotton and gauze, and expressing the results in any scientific way.

The U. S. Army method for gauze is fairly satisfactory for gauze, but not at all so for cotton. It consists in dropping a folded square of gauze upon the surface of distilled water at 25° C. and noting the time for complete submersion.

The U. S. Army absorbency test for cotton is given in full above. It is quite unsatisfactory. Such tests depend on the degree of compression of the sample, condition under which it is drained, etc., etc.

The U. S. Navy requirement for cotton is simply that it shall absorb sixteen times its weight of water. No one can say how this is to be done.

With gauze the U. S. Navy entirely omits all reference to absorbency.

The method of the U. S. P. IX is a rough-and-ready one, wholly unscientific and highly influenced by the personal equation.

We have covered a wide range of methods in the way of percolation and wick tests but have not arrived at a satisfactory conclusion.

We have recently done some further work on absorbency and have only this interesting list of figures to submit, showing the effect of the temperature of the water used in making absorbency tests by the usual or U. S. P. IX method.

Absorbency of Cotton as Influenced by Temperature of Water Used.—Balls of cotton were made by rolling up two and a half gramme pieces and tying with a cotton thread to make balls of similar size (about 1 1/2 inches in diameter). These were thrown on the surface of distilled water.

Temperature of water.	Seconds for cotton ball to become wetted and sink.
5° C. (41° F.)	12
10° C. (50° F.)	9
15° C. (59° F.)	7
20° C. (68° F.)	6
25° C. (77° F.)	5
35° C. (95° F.)	5
50° C. (122° F.)	3
90° C. (194° F.)	2

WATER EXTRACT.

A specification as to the quantity of water-extractive material is important. Not only may it be expected to give figures showing the relative completeness of the removal of the natural salts and gross dirt in cotton, but it also should be an index of the removal of the chemical salts used in the bleaching and boiling processes applied to the cotton as well as of the purity of the water used in the rinsing of them from the fiber after this treatment. In common language, therefore, a water-extractive test should tell us whether the cotton is clean or dirty.

The method as given in the 1912 pamphlet of this laboratory is only approximate and not entirely satisfactory.

The U. S. P. IX contains no water extraction test.

The war-time U. S. Army specification for water extraction of gauze does not specify the method to pursue, and the U. S. Navy specification is quite similar. Chemists would, we think, be expected to use a Soxhlet extracting device where the method is not stated. The fallacy of this will presently be shown.

The U. S. Army method for cotton is similar to that of the Navy and is apparently essentially the correct procedure (see text above). The Navy specification is identical in character.

The following figures show the futility of attempting to extract cotton with water in a Soxhlet apparatus as usually carried out:

Absorbent Cotton—Water Extraction—Soxhlet.—Extraction in all-glass Soxhlet under reflux condenser. Run on electric hot plate at rate of 18 to 20 drops per minute. 10 grammes cotton:

	%
1st 6-hour extraction	0.460
2nd 6-hour extraction	0.458
3rd 6-hour extraction	0.400
4th 6-hour extraction	0.386
5th 6-hour extraction	0.386
	2.090

Two flasks were used in this extraction. One of them lost 0.0326 gramme (= 0.326 percent of the weight of the cotton used) and the other lost 0.0317 gramme (= 0.317 percent of the weight of the cotton used).

Trial runs of Soxhlet extraction apparatus, containing no cotton.
Run for 24 hours—0.104 gramme.
(This would be 1.040 percent on a 10-gramme sample of cotton.)

These figures indicate that the hot water dissolves the glass of the apparatus and at the same time there appears to be some other and unexplained additional regular gain in weight.

Absorbent Cotton—Water Extraction—U. S. Army Method.—Cotton boiled in 250 mils distilled water, 100 mils poured off, 100 mils water added and poured off cold, then 100 mils more added and poured off cold. Run in two series. Series A, first run as above. Series B, a second run on same sample.

	A. %	B. %
1st pressing	0.057	0.025
1st wash	0.025	0.010
2nd wash	0.000	0.002
	0.082	0.037

It is evident from these figures that while in Series A the hot-water extract is entirely removed by one cold-water wash, yet further boiling in more water (Series B) gives a further extraction of solids.

Absorbent Cotton—Water Extraction—Experimental Method.—Boil 10 grammes 5 minutes in porcelain dish with 250 mils distilled water. Pour off 100 mils and add 100 to 125 mils distilled water so as to keep total volume on the cotton at about 250 mils. Boil 5 minutes, pour off 100 mils, and repeat three times more.

Each 100 mils poured off was evaporated and weighed separately with the following results:

	Water soluble. %
1st extraction	0.024
2nd extraction	0.024
3rd extraction	Spoiled
4th extraction	0.014
5th extraction	0.020

It is evident from these figures that this method is valueless.

Discussion of Results of the Foregoing Three Experiments with Water Extraction Methods.—The large amount of glass decomposed by steam and water at the boiling point as shown by the blank determination in the first method (Soxhlet) renders this method unsuitable for this determination, as the blank alone exceeds the Army specification of 0.2 percent.

Of the two methods (the second and third as above) of extraction it is evident that the longer boiling with larger volumes of water (second method) gives higher results than the shorter boiling periods with less water (third method) and results indicate that either the cotton is itself decomposed or dissolved (or both), or that the slight residue in distilled water, 5–10 milligrammes per liter, will seriously affect results. This points to the experimental method (the third) as being preferable to the second. The large volume of water to be evaporated in the second method makes the operation unduly tedious.

Even after reasonable allowances are made there is still no known way to account for the much higher results obtained by the first method than by the others. It is possible that the alkalies known to be liberated from the glass in the first (Soxhlet) method may have a greater solvent or decomposing action on the cotton than the purer water used in the methods in which the boiling is done in a dish and hence give the higher figure.

Although it is evident from the above experiments that an absolutely accurate method of determining the water-soluble content is not available, yet there is no reason to believe that a

satisfactory method cannot be devised by using a moderate amount of boiling water and proceeding in a definite manner. Such a method is suggested later in this paper.

The specification of the military authorities requiring a definite ratio between the organic and inorganic matter in the water extract, appears to be without value.

ALCOHOL EXTRACT.

When the original work on extraction methods was done in this laboratory more than ten years ago, the U. S. Pharmacopoeia VIII being official, the endeavor was to adhere to percolation methods because of their simplicity and also on account of the non-recognition of continuous extraction methods in that work.

The situation is now different because in the U. S. P. IX the continuous extraction method is given official sanction although extraction by ether only is recognized. As the equipment for ether extraction under a reflux condenser is entirely suitable for use with alcohol it may be fair to assume that no objection could be made to alcohol extraction by that method. Nevertheless, the percolation method being official for cotton, we thought it worth while to inform ourselves of the relative accuracy of the two methods.

Alcoholic Extraction of Cotton—Analytical Data.—In the U. S. P. IX method 10 grammes of cotton are packed tightly in a small percolator and extracted with alcohol (no time being stated as to the rate of percolation) until 100 mils are obtained. This is then transferred to a weighed dish, evaporated and dried to constant weight.

In the Soxhlet method 10 grammes of cotton are packed in a wire basket and extracted for six hours in an all-glass extractor on an electric hot plate, the alcohol siphoning over about every fifteen minutes.

The following figures were obtained on the two methods:

Soxhlet.—Six-hour extraction gave 0.47 percent. An additional two hours' extraction gave 0.015 percent more.

U. S. P.—Percolation for 15 to 20 minutes gave 0.155 percent. Two additional portions of 50 mils each of percolate gave 0.05 percent and 0.02 percent, respectively, or a total of 0.225 percent. A second percolation was made taking 45 to 50 minutes for the first 100 mils and this gave 0.22 percent and two additional portions of 50 mils each gave 0.03 percent and 0.02 percent, respectively, or a total of 0.27 percent.

It will thus be seen that the U. S. P. method, after using twice as much alcohol as specified, gave figures only about half that of the Soxhlet method.

Various modifications of the U. S. P. method were then made as follows:

(A) The cotton was packed in a percolator and macerated over night in the alcohol; then percolated in the morning, taking 45 to 50 minutes to obtain 100 mils.

(B) A percolation with hot alcohol was made, allowing 45 to 50 minutes to obtain 100 mils.

(C) By macerating with just enough hot alcohol to thoroughly wet the cotton and have about an inch in the percolator above the cotton, then percolating in the morning with hot alcohol to 100 mils.

Below are tabulated the figures obtained for both methods and all modifications of the U. S. P. method:

ALCOHOL EXTRACT—SOXHLET METHOD.

	%
6-hour extraction	0.47
8-hour extraction	0.485

ALCOHOL EXTRACT—U. S. P. METHOD.

	First 100 Cc. %	First Add. 50 Cc. %	Second Add. 50 Cc. %	Total %
15–20 minutes' extraction	0.155	0.05	0.02	0.225
45–50 minutes' extraction	0.22	0.03	0.02	0.27
(A) Maceration over night, cold alcohol 45–50 minutes' ext	0.29	0.02	0.01	0.32
(B) Hot alcohol, 45–50 minutes	0.36	0.02	0.01	0.39
(C) Maceration with hot alcohol over night and complete percolation with hot alcohol, 45–50 minutes	0.42	0.02	0.01	0.45

The foregoing figures indicate that the modification of the U. S. P. method (C) gives a figure very close to the Soxhlet method. This procedure is, however, difficult, time-consuming and generally inconvenient. We believe that nothing would be lost by substituting the continuous extraction method.

We doubt the value of and need for *any* alcohol extraction test for absorbent cotton. It seems to us that a water extract and an ether extract will tell the story. Only as a test for dyes added for "bluing" would an alcohol extract be useful. That is a very simple procedure and can be carried out as directed in the present U. S. P. IX, omitting the later evaporation and the weighing of the percolate. Hot-water extraction should give the soap and salts remaining from the chemical treatment of the cotton fibers. Ether extraction should indicate the degree of completeness of the removal of oil by the chemical treatment. These, with ash, ought to be sufficient. The original idea of the alcohol extraction was intended as a check on resinous material, possibly not soluble in ether and not removed by hot water.

ETHER EXTRACT.

This is an easy and simple process. The following experimental work was carried out to determine whether there appeared to be any pre-eminently satisfactory method.

Ether Extract of Cotton—Analytical Data.—Three methods for obtaining the ether extract of cotton were compared and the length of time for complete extractions. These methods were:

Ether Extract—Soxhlet Method.—Extracting 10 grammes of cotton in Soxhlet apparatus for 6 hours. Four-hour and eight-hour periods were also tried.

	%
4-hour extraction	0.35
6-hour extraction	0.44
8-hour extraction	0.45

A six-hour extraction obtains practically all ether-soluble matter.

Ether Extract—U. S. P. Method.—Packing 5 grammes of cotton in percolator and percolating until 20 mils of ether are obtained. Additional portions of 20 mils of percolate were obtained until no weighable residue was found.

	Mils.	%
First	20	0.18
Second	20	0.20
Third	20	0.04
Totals	60	0.42

This method, with U. S. P. amounts, gives about 40 percent of the total ether extract. If three times the amount of ether is used the ether extract is then practically the same as by the Soxhlet method and the time is greatly reduced.

Ether Extract—Aliquot Method.—10 grammes of cotton in a large flask, adding 200 mils of ether, shaking occasionally during 4 or 5 hours and allowing to stand over night; then taking off a 100 mils aliquot, representing 5 grammes of cotton, evaporating, drying and weighing.

Ether extract..... 0.24 per cent

This method gives only about 50 per cent of the total ether extract.

ASH.

The U. S. P. requirement for ash is satisfactory. It is essential in determining ash that a sufficient quantity be used to represent a fair sample.

ABSORBENT COTTON IN THE NEW PHARMACOPOEIA.

The following standard requirements are suggested as suitable for the forthcoming revision of the U. S. Pharmacopoeia:

GOSSYPIUM PURIFICATUM.

Purified Cotton.

Gossyp. Purif.—Absorbent Cotton.

The hairs of the seed from one or more of the cultivated varieties of *Gossypium herbaceum* Linné (Fam. Malvaceae), freed from adhering impurities and linters and deprived of fatty matter.

Purified Cotton occurs in white, soft, fine filaments, appearing under the microscope as hollow, flattened and twisted bands, spirally striate, and slightly thickened at the edges; inodorous and almost tasteless; insoluble in ordinary solvents but soluble in an ammonia solution of cupric oxide.

When Purified Cotton, previously compressed in the hand, is thrown on the surface of cold water (25° C.) it immediately absorbs the latter and sinks.

Incinerate 5 Gm. of Purified Cotton; not more than 0.2 percent of ash remains.

Thoroughly saturate about 10 Gm. of Purified Cotton with 100 mils of distilled water, then with the aid of a glass rod press out two portions of the water, 25 mils each, into white porcelain dishes. Add to one portion 3 drops of phenolphthalein T. S. and to the other portion 1 drop of methyl orange T. S.; no pink color develops in either portion (alkali or acid).

Extract 10 Gm. of Purified Cotton, tightly packed in a narrow percolator, with ether, until the percolate measures 200 mils, and evaporate this to dryness; the residue does not exceed 0.6 percent (fatty matter).

Extract 10 Gm. Purified Cotton in a narrow percolator with alcohol, until the percolate measures 50 mils. When observed downward through a column 20 Cm. in depth, the percolate may show a yellowish color, but no blue or green tint (dyes).

Place 10 Gm. Purified Cotton in 200 mils of boiling distilled water, using a porcelain casserole. Boil for five minutes, pressing the cotton through the water with a glass rod. Press out with the rod and pour off 100 mils of the water. Add 50 mils cold (25° C.) distilled water, working it thoroughly through the cotton and press out and pour off 50 mils. Use two more 50 mil portions of cold distilled water as above directed, to wash the cotton. Evaporate the collected waters to dryness. The weight of the residue does not exceed 0.25 percent of the weight of cotton used.

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THE TARIFF AND THE CRUDE DRUG.*

BY ERNEST E. STANFORD.

Our early customs legislation seems scarcely to have noticed medicinal articles. Rum, an early source of British-American tax dissention, had in colonial days not reached its present medicinal demand. Excited Bostonians turned their harbor into a decoction of caffeine with no prescience of Dr. Wiley and without noting the cardiac symptoms of the startled codfish though the exploits' effect on the heart of the young country is a matter of record. Early tariff lists, both Colonial and post-Revolutionary, bore little resemblance to the detailed schedules since worked out under the marvelous development of modern manufacture, commerce and lobbyism. While the trade in healing substances is ancient as commerce, medicinal duties in the days of Washington and Adams would have yielded but a negligible revenue. The colonists, without regret, perhaps, had largely abandoned the crude and inaccessible European materia medica, and had adopted, and largely increased by experiment, the Indian medicinal lore. Articles of prominence in their tariffs were those chiefly concerned in the bitter commercial rivalry between Americans and their relatives across the seas. A jealous Parliament favored English textiles and manufactures with little or no duty, but laid heavy burdens on sugar, molasses, spirits, and tobacco of intercolonial trade. In developmental days under independence—and, indeed, in much later times—tariffs grouped themselves largely around three basic American industries—cotton, wool and iron.

On July 4, 1789, was passed the first Tariff Act of the United States under the Constitution. Under this Act drugs, except "dyeing woods and dyeing drugs," and medicines were taxed without specific mention at 5% ad valorem. Under the next act, that of August 10, 1790, "Anniseed" at 10 % ad valorem enjoys the distinction of being the only drug product specifically mentioned (if we except those more commonly used as spices) and has held a position, with frequent change both of orthography and duty, in nearly all detailed succeeding Acts. "Dyeing drugs," so necessary in the developing textile industry, were taxed 5%, and "medicinal drugs, except those commonly used in dyeing," being perhaps considered more of a luxury, paid 7½%. Balsams, at 10%, first appear in 1792, and gum arabic and gum senegal, at 7½%, in 1816. In 1825 castor oil drew a specific duty of 40 cents per gallon, and camphor, crude and refined, was assessed 8 cents and 10 cents per pound, respectively.

The Act of July 14, 1832, includes in its free list the first detailed tariff enumeration of medicinal commodities. It included such articles as opium, gum arabic, camphor, Peruvian bark, chamomile flowers, cantharides, gamboge, ipecacuanha, sarsaparilla, "assafoetida," henbane, manna, senna, nux vomica, and about thirty others. Medicinal drugs not thus specifically favored paid 12½% ad valorem.

In 1841 the medicinal free list was virtually repeated, and the unlisted drugs rose to 20%. Opium now paid its first duty—75 cents per pound. In 1846 nearly all medicinals suffered impositions of from 5% to 30%, gum benzoin, bitter apples, and "boucho" leaves being among those newly listed. From that date to 1870 few drug products were free from some form of duty. They were for

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the most part, evidently, treated as pure revenue articles; being wholly produced abroad, there was no question of "protection of infant industry;" legislators had to deal only with the possible reaction of the ultimate consumer, who probably suffered inappreciably from the tax he did not see.

During the emergency period of the Civil War rather drastic duties were imposed on many essential articles. Ergot, 20 cents; aloes, 6 cents; manna, 25 cents; mastic, ipecac, jalap, and cardamom seed, at 50 cents per pound, are examples. Later these high duties, with all others listed, were raised 50% for a short period.

In the "protective" tariffs of 1870 and 1872 drugs, as needing no protection, appear in detailed array on the free lists, where they have since, for the most part, maintained their position. The latest Act, that of 1913, alone of those of recent date, singled out for specific rate a few drugs of large import. Ergot, 10 cents; gentian, 1/4 cent; sarsaparilla, 1/4 cent; licorice, 1 cent; and buchu leaves, 10 cents per pound, are of chief importance aside from the narcotics, which will be mentioned later. Possibly the large use of some of these in proprietary medicine had some part in bringing them to the notice of our legislators. Unsettled commerce conditions of years since render it difficult to trace any effect of these duties on import volume; doubtless such effect has been negligible, inasmuch as the cost of most crude drugs is but a minor part of the expense of medicinal manufacture. In case of buchu, normally highest in price of these products, the duty was immediately followed by an almost equivalent drop in import values. Inasmuch as America dominates by far in the buchu market, it appears that our importers found a way to make the foreigner stand the loss, whether or not the American consumer was made aware of it.

The Free List of the present enactment bears a "basket clause" adopted in slightly different form from a previous tariff as follows: "Drugs, such as barks, beans, berries, buds, bulbs, bulbous roots, excrescences, fruits, flowers, dried fibers, dried insects, grains, gums, herbs, leaves, lichens, mosses, roots, stems, vegetables, seeds (aromatic, not garden seeds), seeds of morbid growth, and weeds;....." Under this, it would seem, few medicinals could escape inclusion. Elsewhere, however, in the alphabetical order of the free list, occur by name many other botanical and animal drugs. The only apparent effect of such listing is to secure free entry for shipments of such drugs ground, as the latter would otherwise be subject to the analogous basket clause of Schedule A, which imposes a 10% duty on drugs in advanced condition. Some drugs thus listed are of first-rank importance—cinchona, nux vomica, ipecac, and jalap, for instance. Of the Scriptural "Balm of Gilead," however, no import has been noted in recent years; present-day events would indicate, indeed, that there is no longer "balm in Gilead." Also, the average pharmacist would be greatly troubled by a call for "salep or salop."

TARIFF HISTORY OF THE NARCOTICS.

The tariff history of opium and coca leaves and their derivatives and compounds presents many points of interest. The more recent legislation on these articles, drawn up as it was before the enactment of the Harrison Narcotic Law, was evidently designed to restrict traffic in these dangerous drugs, although,

incidentally, it produced a revenue larger than that yielded by all other imported drug products combined.

Opium first emerges from the category of "Drugs and Chemicals" on the free list of 1832. In 1842 a specific duty of 75 cents per pound was imposed, no doubt solely as a revenue measure. Four years later with many other drugs, opium was placed on an ad valorem basis at 20%. In 1857 this was decreased to 15%. During the late fifties our opium imports reached a figure of 100,000 to 150,000 pounds annually. This consisted largely of smoking opium, consigned to Pacific ports, ostensibly for the use of the Chinese. It was quite evident, however, that the seductive vice of "hop" was rapidly spreading among the white race. An effort was now made to tax only medicinal opium on a revenue basis, and to place a prohibitive duty on the smoking variety. In the early sixties medicinal opium paid first $2.00 and later $2.50 per pound, while the smoking grade was placed on an ad valorem basis, first at 80% and later at 100%. These impositions stopped open smoking opium trade almost wholly, but an enormous smuggling business soon developed. The tariff of 1870 placed the medicinal opium duty at $1.00, and that of smoking opium at $6.00 per pound. This also was a reduction, inasmuch as the smoking opium then sold at about $10.00. At this rate annual legalized importations of 50,000 to 70,000 pounds were entered; in 1883, when increased rates were anticipated, they rose to 298,000 pounds.

During the discussion of the next two tariffs there was a popular demand for the exclusion of smoking opium. This was no doubt increased by the Chinese-American treaty of 1880, by the terms of which Chinese subjects resident in America were forbidden to import the drug. The Tariff of 1883 first graded opium according to its morphine percentage; that containing less than 9% of morphine, from which smoking opium was manufactured, was forbidden entry, yet that prepared for smoking was allowed to enter at $10.00 per pound. Medicinal opium paid only $1.00; evidently the enormous abuse of this drug dawned but slowly on our legislators, inasmuch as under a later tariff it was allowed free entry. Both low-grade and smoking opium were again permitted entry in 1890, and both entered enormously, both above-board and underground. After the passage of the Pure Food and Drugs Act of 1906, its provisions forbidding the import of "drugs dangerous to the health of the people of the United States" were utilized to prevent the entry of smoking opium. The entry of low-grade and smoking opium was, in effect, prohibited by other legislation in 1909, though for some legal or traditional reason, obscure to the layman, its mention is still included in the Act passed four years later, which is still in force. The present rates on medicinal opium—$3.00 per pound on the crude grade and $4.00 on the dried or powdered drug—may have been placed thus high in an effort to limit importations, in view of the wide-spreading illegitimate use by addicts. Neither examination of import statistics nor consideration of the actual tax per narcotic dose indicates any alleviation of the abuse of opium through taxing its entry. Prior to the War, from 400,000 to 500,000 pounds entered annually; from ten to twenty times the per capita amount used by other civilized nations. Fortunately the Harrison Narcotic Law and the recent War Revenue Act have provided machinery, imperfect though it may be, for removing narcotic regulation from the purview of the Tariff.

Coca leaves, of course, are a much more recent addition to our materia medica. The duty of 5 cents per pound of 1909 was raised to 10 cents in 1913. Coca leaves seem never to have gained notable narcotic use in North America, though this may be due to the comparative availability and more rapid effect of their more easily concealed alkaloid than to legal regulation of their use. It may here be noted that the high duty rates on opium and coca alkaloids have, under normal conditions, provided a virtual American monopoly for domestic manufacturers.

THE QUESTION OF PROTECTION.

Protection for the crude drug seems never to have found a place in our Congressional political economy. The reason is not far to seek. Direct competition between American and foreign medicinals has heretofore been almost non-existent. Cinchona from South America and Java, opium from Turkey and Persia, licorice from Southern Europe and the Levant, gentian from Austria and France, nux vomica from India—of the great staples none were grown in America. America herself stood without a rival in ginseng, hydrastis, cascara sagrada, podophyllum, and other indigenous medicinals. If European buckthorn, Indian or Alexandria senna, or Curaçao aloes affected the market for American cascara, the conflict was not sufficiently visible to arouse protest.

While the non-existent grower could need no protection, the wide-awake manufacturer was not slow to claim it. Few articles beyond the crude stage enter duty-free. Prepared medicinals are graded chiefly by their alcoholic or narcotic content. The important cinchona alkaloids and strychnine, in spite of repeated pleas, receive no protection, whereas alkaloids in general are favored by a 15% ad valorem. A basket clause like that already referred to imposes a 10% duty on drugs ground, powdered, or otherwise advanced. A duty of this type would certainly seem ample to exclude expensive ground drugs, but not to deter the entry of many cheap products of this description. Probably the general prejudice against foreign-ground drugs on account of their liability to adulteration operates in general more efficiently than the duty to hinder the import of commodities which the average consumer buys chiefly on faith.

But in recent years the situation has changed in part. The past generation's bulky materia medica has been decimated by science, which has little regard for tradition. Some medicinals have held their ground, and extended it. Never until to-day was there such a demand for products of demonstrated worth. Not to mention the rapid strides of opium and coca, which we "view with alarm" though we recognize the essentiality of these drugs, there is world-wide and insistent call for such drugs as cinchona, nux vomica, ipecac, belladonna, digitalis, hydrastis, and many others. Even before the stimulus of war was applied, American scientists and agriculturists—not that the terms need be separated—had produced the chief solanaceous plants, and also digitalis and cannabis, on an experimental or limited commercial scale. The War, cutting off our normal supplies of these drugs, enormously increased their price, and naturally the interest in their production, even before our own national Army was created to call for supplies.

According to Dr. W. W. Stockberger, of the Bureau of Plant Industry, to whom the major credit for putting this industry on its present basis is due, in

1918 belladonna, digitalis, cannabis, henbane, calendula, and sage were commercially produced in this country; the first three named even in oversupply. Culture of stramonium, valerian, santonica, pyrethrum, and several native drugs has also been reported. This cultivation has not been of easy development. Scientific knowledge, agricultural skill, expensive hand labor, high-priced land—all these are needed, as many ill-prepared enthusiasts discovered to their financial loss. Even with these essentials, failure after failure has been caused by unsuitable soil or climatic conditions, by insect pests, or by disease. More than a mention of the chief difficulties of the drug cultivator is beyond the scope of this paper. Others, from bitter experience, have recounted them. But if failures have been numerous, successes have been brilliant. The application of agricultural science, especially that of genetics, to the culture of medicinal plants is in its early infancy. But the achievements of American growers in developing highly potent strains of belladonna, cannabis, and digitalis, are a matter of record. The future of the industry, nevertheless, is a matter of doubt. Successful agricultural methods are many fold more costly than the careless, ignorant collection of wild plants by old men, women and children who form the drug-collecting classes of Europe. While quality must in the future be valued more than in the past, American drugs, despite their superiority, cannot maintain a paying price in the market under a renewal of pre-war conditions. The production of medicinal products, from the sowing of the seed to the packing of the finished product, is worthy of the highest intellect and the best trained skill. Intellect and skill, in this age, demand and deserve a high reward. If one calling does not yield it, another will. The profession which fails to feed its workers will presently be a dead profession—though it may not be wholly a deserted one. If the three-fold partnership of agriculture, pharmacy and medicine is to continue best to serve the public weal, no partner must be starved. If our newly begun scientific drug cultivation is to lapse, America will again be at the mercy of the outside world for drugs needful to the public health. Our past experience should be enough of that.

With arguments such as these, the plea for protection will no doubt project itself into the maelstrom of the next Tariff revision. What the outcome will be no one can tell. The commercial insignificance of the industry may tell against it, for it can supply little eloquence of money. The alarm of increased cost of medicine is sure to be raised against it. This can well be met by graphically showing the actual increase per medicinal dose contingent upon a protective duty. High protection, in items of such limited commercial demand, will be certain to defeat its own ends by stimulating oversupply. But if American medicinals are to win the leadership of the world, intelligent domestic production of all possible basic materials must in some way be secured.

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REVISION OF THE MONOGRAPHS OF OFFICIAL CHEMICALS*

BY H. V. ARNY.

In discussing this phase of the pharmacopoeial revision attention must be called to the importance of the correct wording of the text of official chemicals because of the frequent scrutiny given the chemical monographs by attorneys attempting to get clients out of tight phases when their products are being subjected to the scrutiny of the law.

Two of many such cases might be cited by way of illustration. In one case, the attorney asked the chemist whether mercury was volatile. "I would not consider it so," was the response. The attorney forthwith asked the chemist to read page 220 of U. S. P. IX, where it is stated "at ordinary temperatures mercury volatilizes very slowly," and forthwith began to expatiate upon the possibility of the ointment of mercury, upon the weakness of which the case was based, losing strength by volatilization during the manipulations directed in the official assay.

In another case, the defense in a case of shortage of strength of a solution of magnesium citrate attempted to confuse the issue by the following argument:

Each 100 mils of the Solution should contain 1.5 Gm. magnesium oxide.

Each 100 Gm. magnesium carbonate U. S. P. should contain 39.2 Gm. magnesium oxide.

$$\text{Since } \frac{100}{39.2} \times 1.5 = 3.8,$$

each 100 mils of the Solution should contain 3.8 Gm. magnesium carbonate U. S. P. and a bottle of the Solution (350 mils) should contain 3.8×3.5 or 13.3 Gm. magnesium carbonate U. S. P. instead of 15 Gm. directed in the official formula.

Such arguments were, of course, merely quibbling, but they do point out the need of great explicitness in wording the monographs of the official chemicals and great care in making the prescribed tests as nearly "fool-proof" as possible.

Such thoughts actuated the talented chairman of the two sub-committees entrusted with the preparation of the monographs on inorganic and organic chemicals in the present Pharmacopoeia, Charles H. LaWall and George Rosengarten, and no one realizes this more than does the former's successor, the present writer. There are but few invitations to legal quibbles found in the carefully prepared texts and carefully worked out tests, and what changes I have to suggest are largely because of changed conditions coming into being since U. S. P. IX has been published.

"Faint Turbidity" Tests.—A prolific source of misunderstandings between analysts are time-honored tests of the Pharmacopoeia where it is stated that when a solution of the chemical under examination is mixed with a certain test solution "not more than a faint turbidity" or "not more than a slight opalescence" should rest. If distinct turbidity or opalescence is shown, the presence of some impurity is indicated. In such test the question arises, "What is a faint turbidity?" The chemist in the chemical works is apt to consider as a "faint turbidity" what the chemist of the pure drug enforcement bureau might consider an extremely

* Read before Scientific Section A.Ph. A., City of Washington meeting, 1920.

turbid and, until the wording of such tests is made more precise, the controversy will continue and provoke trouble in pure drug litigation.

The sub-committee on inorganic chemicals during the past year gave its attention to this matter and, as a result, a grant was made by the U. S. P. Board of Trustees permitting John M. Williams to study the question under the supervision of the writer of this paper.

We first established the sensitivity of the tests involved finding that:

Silver nitrate shows chlorides in a dilution of 1 in 500,000
Barium chloride shows sulphates in a dilution of 1 in 100,000
Magnesium mixture shows phosphates in a dilution of 1 in 40,000
Ammonium molybdate shows phosphates in a dilution of 1 in 400,000
Potassium sulphate shows barium in a dilution of 1 in 40,000.

We next examined several samples of each of the following commercial chemicals for which "faint turbidity" tests are provided and found the following limits of impurity easily attained.

Chemical.	Impurity.		
Magnesium sulphate	chloride	2	parts in 100,000
Sodium phosphate	chloride	2	" " "
Ammonium carbonate	chloride	0.50	" " "
Calcium glycerophosphate	chloride	10	" " "
Zinc sulphate	chloride	0.01	" " "
Bismuth subnitrate	chloride	0.01	" " "
Sodium bromide	sulphate	10	" " "
Sodium iodide	sulphate	20	" " "
Lithium bromide	sulphate	50	" " "
Ammonium bromide	sulphate	15	" " "
Ammonium carbonate	sulphate	50	" " "
Calcium bromide	sulphate	20	" " "
Calcium glycerophosphate	sulphate	500	" " "
Zinc chloride	sulphate	20	" " "
Potassium iodide	sulphate	20	" " "
Sodium hypophosphite	phosphate	50	" " "
Calcium glycerophosphate	phosphate	1	" " "
Sodium glycerophosphate	phosphate	1	" " "
Potassium bromide	barium	25	" " "
Potassium iodide	barium	25	" " "
Sodium bromide	barium	25	" " "
Sodium iodide	barium	25	" " "
Ammonium bromide	barium	25	" " "
Calcium bromide	barium	25	" " "
Strontium bromide	barium	25	" " "

After a study of these findings, the sub-committee decided to recommend to the incoming sub-committee the adoption in the next Pharmacopoeia of more precise turbidity tests. Such tests could direct, for instance, that a five percent solution of the salt mixed with definite amounts of the appropriate reagents and diluted to a definite volume, say 10 mils, should show no more turbidity than a 5 percent solution of the C. P. chemical to which has been added a definite volume of a standard solution of the impurity plus definite amounts of the appropriate reagents and diluted to the definite 10 mil volume, the two fluids compared in test-tubes.

Chlorides in Bromides and Iodides.—This is one of the most troublesome and unsatisfactory tests of the Pharmacopoeia and presents a subject that should be

given further study. Such a recommendation has been made by the present sub-committee to the incoming committee.

Miscellaneous Suggestions.—In the extremely important list of pharmacopoeial suggestions published by the Committee on Revision in the March and April numbers of the JOURNAL are found many references to changes needed in the phraseology of the monographs of, and tests for, the official chemicals. To these at this place I will add a few that have come to the notice of Dr. Hugo H. Schaefer and myself in our daily routine of chemical testing.

Alkaloidal Assays.—In these days when chloroform is very expensive, attention should be given to the use of other "shaking-out" solvents which are cheaper and are equally efficient.

Camphorated Oil.—While the polarimetric assay given in the present Pharmacopoeia is scientifically correct, it is not only time-consuming but also demands a larger amount of the sample than is feasible to collect in a drug law enforcement case. We find the evaporation method of the German and Swiss pharmacopoeias entirely satisfactory, although giving somewhat higher results than really obtain. This, however, is a blending of mercy with justice, a quality not entirely out of place in a court proceeding. Of course in carrying out the evaporation assay the analyst must see that the sample is freed from water, alcohol or ether before the assay is carried out.

Mild Mercurous Chloride.—In the assay of calomel tablets, the official method does not work satisfactorily, since the calomel dissolves very slowly in the tenth-normal iodine solution. Dr. A. B. Lyons (J. AM. PHARM. ASSOC., 7, 1918, 939) has suggested the use of a fifth-normal iodine solution but in the discussion of the matter before the sub-committee on inorganic chemicals it was pointed out that instead of introducing a new volumetric solution into the Pharmacopoeia the same result can be obtained by lessening the amount of calomel used. In U. S. P. IX it is said "Mix . . . . about 1 gramme of mild mercurous chloride." If this direction is changed to "about 0.5 gramme" the assay will be performed without trouble.

Quinine Hydrobromide.—We have found that the differentiation of quinine hydrobromide from the hydrochloride of that alkaloid is not easy, which perhaps explains why the present Pharmacopoeia presents no test of distinction. We have worked out a method that brings the desired result and will publish it elsewhere within the next few months.

Solution of Magnesium Citrate.—There is being sold a considerable quantity of this solution containing a shortage of citric acid and it is therefore desirable that the next Pharmacopoeia provide assays for the magnesium oxide and for citric acid. For the latter, the assay suggested by J. L. Mayer,[1] which is an adaptation of the present blanket assay for alkali salts of organic acids, has in our hands produced satisfactory results. Incidentally, as mentioned above, attempts should be made to reconcile more accurately, than at present obtains, the statements made as to the MgO content of this Solution and of the magnesium carbonate from which it is made.

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[1] JOURNAL A. PH. A., March 1920, p. 253.

STABILITY OF CHLORAMINE ANTISEPTICS.*

BY JULES BEBIE.

The synthetic organic chlorine antiseptics chloramine-T and dichloramine-T have found successful application in recent war surgery and filled the great demand for powerful, non-toxic and comparatively non-irritating disinfectants. As a natural consequence they are finding their place in civilian surgery and are beginning to be widely used. Investigation of their properties and applications was therefore desirable.

Too great stress cannot be laid on the necessity of working with pure products and it is safe to assume that most of some of the contradictory statements regarding properties and therapeutic action of the chloramines are entirely due to variable purity of these products in the hands of the different investigators. This refers particularly to the question of stability of the chloramine antiseptics and it is this phase of the subject which has received chief attention in our work.

1. CHLORAMINE-T.—SODIUM PARA TOLUENE SULPHONCHLORAMIDE.

$$CH_3.C_6H_4.SO_2.NClNa + 3H_2O.$$

The commercial product is on the market in form of the crystallized material containing 3 molecules of water of crystallization. The theoretical percentage for chlorine is 12.6, for water 19.2; the limits of the N. N. R.[1] standard are 11.5–13% Cl and 17–20% H_2O. The importance of the purity of the chloramine products justifies a critical survey of this standard.

If we take the extreme case of a product containing the minimum allowable amount of water, namely 17%, and the minimum allowable amount of Cl, namely 11.5%, we arrive at a Cl content of the anhydrous product of 13.85%, against the theoretical percentage of 15.6%. The purity of such a chloramine-T, based on the chlorine percentage, would be only 88.7%.

It was found in factory experience that it is feasible, without throwing any particular burden on the manufacturer, to obtain regularly products of 96–98% purity. Since water content of 18–20% and chlorine of above 12% are quite compatible with normal factory practice it would appear to be desirable to raise the standard of chloramine-T to 18–20% H_2O and 12.25–13% Cl. The minimum percent purity which could pass with such requirements would be represented by a product containing 18% H_2O and 12.25% Cl. The chlorine on the dry basis figures out 14.94% and the percent purity 95.8.

On account of the great usefulness of chloramine-T and its many advantages over other antiseptics it was of importance to establish the stability of this product on storing in the dry form as well as in solution. It was found that the stability of chloramine-T is directly contingent upon the purity of the product, and the latter is dependent on the purity of the intermediate, the method of manufacture and the kind of apparatus in which it is made. Impure products were found to show considerable gradual decomposition until they were completely decomposed. But it is quite feasible to produce in regular manufacture a product of constant high purity and uniform quality. Such a product is very stable both in

* Paper read at St. Louis meeting, April 1920, and published by courtesy of American Chemical Society.

[1] New and Non-Official Remedies, 1919.

crystal form and in solution as shown by the following tabulated results. A high standard of purity for chloramine-T is therefore an essential condition for ensuring stability of the product.

The first table gives the results obtained with chloramine-T in dry form, when made into tablets. No. 1 represents a hand-moulded tablet without any addition, No. 2 a hand-moulded tablet made with addition of 1% $NaHCO_3$.

TABLE I.

	No. 1. % Cl.	No. 2. % Cl.
Originally	12.29	12.22
After 1 month	12.27	12.24
After 2 months	12.23	12.21
After 4 months	12.21	12.18
After 6 months	12.26	12.30

The original product used for these tests contained 0.05% NaOH and the alkalinity was not changed after six months, which is another indication that no deterioration took place.

Table II gives the results on chloramine-T crystals in dry form from various manufactured lots when kept for one year in glass bottles.

TABLE II.

	1.	2.	3.	4.	5.	6.
% chlorine originally	12.37	11.56	12.16	12.11	12.01	11.76
% chlorine after one year	12.06	11.77	11.91	12.26	11.90	11.94

The slight differences are mostly within the limits of experimental errors, which is also indicated by the fact that on some products the chlorine percentage after one year was found slightly higher than originally.

Since after one year's storing of chloramine-T no indication of decomposition can be observed it can be safely claimed that chloramine-T in dry form, loose or in tablets is a stable product.

The results of the investigation with aqueous chloramine-T solutions are given in Table III. The recorded figures represent the percent available Cl in 10 Cc.

TABLE III.

Chloramine-T.	In brown bottle. 2%.	In white bottle. 2%.	In brown bottle. 4%.	1/2% Na_2CO_3. 4%.	1% $NaHCO_3$. 4%.	1% NaCl. 2%.	30% glycerine. 2%.	15%.
Originally	2.38	2.31	4.76	4.68	4.78	2.35	2.39	16.44
1/2 month	....	....	....	....	....	...	2.30	.....
1 month	2.30	2.35	4.76	4.68	4.81	2.30	2.30	16.38
2 months	2.31	2.35	4.76	4.70	4.85	2.28	1.76	16.38
3 months	2.32	2.29	4.75	4.65	4.79	2.28	0.23	16.62
4 months	2.32	2.25	4.64	4.86	4.86	2.31	0.123	.....
5 months	2.35	2.26	4.77	4.72	4.85	2.32	0.032	.....
8 months	2.28	2.22	4.82	4.70	4.88	2.34	.....	.....

These results demonstrate that chloramine-T solutions of 2–15% on 8 months' standing show no loss of available chlorine and can safely be considered stable. Color of container has no bearing.

Addition of NaCl, $NaHCO_3$, Na_2CO_3 does not influence the stability of the chloramine-T. In a 30% glycerin solution containing 2% chloramine-T the

latter shows very little decomposition after one month, towards the end of the second month the decomposition is very much advanced and after three months' decomposition has progressed to the extent of about 90%.

II. DICHLORAMINE-T. PARA TOLUENE SULPHONDICHLORAMIDE.

$$CH_3.C_6H_4.SO_2.NCl_2.$$

A pure product should comply with the following specifications:

Appearance: Yellowish crystals.

Available chlorine: 29%.

Water extract: Neutral reaction (1 Gm.–100 Cc.).

Solubility: 1 Gm. completely soluble in 1 Cc. of benzol.

Based on the chlorine percentage such a product would represent a purity of 98.8%.

Dichloramine-T can be obtained as a white powder by direct chlorination of an alkaline solution of para toluene sulphamide.[1] This product, even when made and washed with every precaution, is not very satisfactory in regard to stability. After three months' storing the solubility in benzol is not complete any more and after four months of storing a strong odor of chlorine develops, indicating decomposition. The highest degree of stability of dichloramine-T can only be obtained with a crystallized product. All of the following figures and remarks refer to the crystallized dichloramine-T which is on the market in form of yellowish crystalline granules.

Various samples were examined monthly for chlorine percentage, melting point and solubility in benzol. On all of these samples no change at all was noticeable after six months, after eight months a slight decomposition was indicated in some samples by slightly lower melting point, and after eleven months solubility in benzol was not complete any more, also indicating slight decomposition. After thirteen and fourteen months lower Cl percentage and presence of benzol insoluble matter are noticeable. However, since the difference in the Cl percentage and melting point are almost within the limits of experimental errors, and since the reaction of the water wash is still neutral, the degree of decomposition after fourteen months may be considered minute.

A few of the results of this investigation are tabulated in Table IV.[1]

TABLE IV.

	Sample A.			Sample B.			Sample C.		
Time.	% Cl.	M. P.	Sol. 1:1.	% Cl.	M. P.	Sol. 1:1.	% Cl.	M. P.	Sol. 1:1.
Originally..	29.21	80/81	Complete	29.32	80.5/81.5	Complete	29.13	80/81	Complete
1 month..	28.91	80/81	Complete	29.18	80.5/81.5	Complete	28.88	80/80.5	Complete
2 months.	29.10	80.5/81	Complete	29.08	80.5/81.2	Complete	28.86	80/81	Complete
3 months.	29.02	80.5/81	Complete	29.30	80.2/81.0	Complete	29.11	80/81	Complete
4 months.	29.07	80/80.8	Complete	29.07	80.5/81	Complete	29.19	80/81	Complete
6 months.	29.05	80/81	Complete	29.16	80.5/81	Complete	28.80	80/81	Complete
8 months.	28.97	79.5/80.5	Complete	29.28	79.5/80.4	Complete	29.05	79/80.5	Complete
11 months.	29.10	79.5/80.5	Complete	29.14	79.5/80.4	Complete	29.13	79/80.2	Complete
13 months.	28.91	79.5/80.5	Fair	28.91	79.5/80.4	Complete	29.06	79/80.2	Complete
14 months.	29.06	79.5/80.5	Fair	28.99	79.5/80.4	Complete	29.08	79/80	Fair

[1] R. B. Krauss and E. Crede, "Dichloramine-T and Chlorinated Eucalyptol 1.2," *Jour. Am. Chem. Soc.*, 1917, p. 2720.

It was anticipated that even the crystallized product might contain traces of impurities which might slowly react with the dichloramine and cause some decomposition. In order to decide whether or not the chemically pure dichloramine-T is a stable product a very pure material was prepared by several recrystallizations from chlorbenzol until a constant melting point was obtained. No definite signs of deterioration could be observed after fourteen months. The results are given in Table V and show that the deviations are about within the limits of experimental errors.

TABLE V.

	% Cl.	M. P.	Solubility.
Originally	29.39	81/82	Complete
1 month	29.36	81/82	Complete
2 months	29.27	81/82	Complete
4 months	29.23	81/82	Complete
6 months	29.30	81/82	Complete
8 months	29.30	80.7/81.3	Complete
11 months	29.22	80.5/81	Complete
13 months	29.31	80.5/81	Complete
14 months	29.20	80.5/81	Complete

STABILITY OF DICHLORAMINE-T IN CHLORCOSANE SOLUTION.

No solvent for dichloramine-T has been found yet which is at once entirely satisfactory from the surgical standpoint and which will give a permanently stable solution. Chlorcosane gave the most satisfactory results in this respect so far. Here again the highest degree of purity of the dichloramine-T is of greatest importance. In a recent publication by Sollmann[1] a very poor stability of dichloramine-T in chlorcosane is reported. After one month only 60% of the dichloramine-T added remained undecomposed. Our results with crystallized commercial dichloramine-T show a much slower degree of decomposition, as demonstrated in Table V.

TABLE VI.

	Percentage of the added dichloramine-T that remains undecomposed at the time stated.	
	2½% solution.	5% solution.
10 days	98.8	99.6
1 month	93.4	96.8
5 weeks	....	92.8
2½ months	85.0	84.7

It was also found that drying of the solution by shaking with anhydrous calcium chloride has a favorable effect on its stability and such a solution had decomposed less than one percent after three weeks, and contained only traces of HCl and Cl.

Stock solutions prepared in this manner, and when not exposed to light and heat, could be considered serviceable for hospital use for at least a couple of weeks. The results given in Table VI were obtained in March and April. A similar investigation carried out during the summer gave a somewhat greater speed of decomposition.

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[1] Torald Sollmann, *Journal of the Amer. Med. Assn.*, 1919, p. 992.

TABLE VII.

	Percentage of the added dichloramine-T that remains undecomposed at the time stated.	
	Dichloramine-T solution not treated.	Dichloramine-T solution treated with $CaCl_2$.
3 weeks	97.4	99.2
5 weeks	94.3	95.7

Since the preparation of the dichloramine-T chlorcosane solution requires heating and therefore cannot be conveniently made at any place it would be desirable to have a solvent which would give a permanently stable solution. From theoretical consideration, only a completely chlorinated hydrocarbon can be considered for this purpose. The results obtained with a 10% solution of dichloramine-T in tetrachlorcarbon are given in Table VIII.

TABLE VIII.

	Tetrachlorcarbon.		Tetrachlorcarbon.	
Time.	Commercial Total solids.	% Cl.	Commercial. Total solids.	Redistilled. % Cl.
Originally	11.61	28.55	11.12	28.28
After 1 month	11.43	28.55	11.31	28.23
After 2 months	11.42	28.53	11.21	28.29
After 3 months	11.48	28.53	11.24	28.30
After 4 months	11.48	28.35	11.24	28.30
After 6 months	11.58	28.46	.....	.....

The results obtained so far up to a period of observation of six months would indicate that dichloramine-T in tetrachlorcarbon is stable. However, such a solution seems to have some objectionable features from the surgical point of view, but it might be considered to make a 20% stock solution of dichloramine-T in tetrachlorcarbon and dilute it before use with the required amount of chlorcosane.

III. HALAZONE: PARA SULFONE DICHLORAMIDOBENZOIC ACID.

$$COOH.C_6H_4.SO_2NCl_2.$$

This product is not used as an antiseptic but as a disinfectant of water only. It is on the market in dry form as a white, insoluble powder or in form of tablets mixed with sodium carbonate or borax to make it water-soluble. The observation was made that when 1 part of halazone was mixed with $^1/_2$ part of anhydrous Na_2CO_3 the product dissolved only with difficulty in water, but if it was mixed with $^1/_2$ part of the monohydrate of sodium carbonate containing 15% of water the resulting mixture dissolved quite readily in water. It was also found that mixtures of equal parts of halazone and sodium carbonate monohydrate dissolve readily and without decomposition in water, in concentration not higher than one per mille. When higher concentrations are used some decomposition takes place under development of chlorine and deposition of some insoluble material.

The loss in chlorine and percent of several samples of halazone which have been stored in glass containers for nine months is given in Table IX.

TABLE IX.

				Purity based on chlorine percentage. Theory = 26.26% Cl.		
No.	% Cl originally.	After 9 months.	Loss Cl in %.	Originally.	After 9 months.	% loss pure halazone.
1	24.45	23.80	0.65	93.1	90.6	2.5
2	24.40	23.35	1.05	92.9	89.0	3.9
3	25.17	24.20	0.97	95.8	92.0	3.6

The loss in Cl amounts to about 1% equivalent to about $3^1/_2$% deterioration of the halazone.

Since this product is not used as an antiseptic the deterioration, combined with slight acidity, is not serious. Halazone can be considered fairly stable for one year at least. It should be remembered that the deterioration of the chloramines is a function of the temperature and that under tropical conditions, for instance, considerably higher speed of decomposition may take place than reported in our investigation.

To sum up we arrive at the following:

CONCLUSIONS.

1. In order to assure the greatest possible degree of stability of chloramine-T, dichloramine-T and halazone, these products should be produced with a high degree of purity.

2. Judging from observation extending over the period of one year chloramine-T can be considered stable in crystal form and in aqueous solution, by itself and in mixture with NaCl, Na_2CO_3 or $NaHCO_3$.

3. Dichloramine-T in amorphous powder form begins to deteriorate after about three months. The crystallized commercial product, however, is stable for about eight months and after fourteen months shows only slight degree of decomposition. A specially prepared and exceptionally pure product showed no definite signs of deterioration after fourteen months' storing.

4. Solutions of dichloramine-T in chlorcosane, of $2^1/_2$–5% strength, particularly when previously dried with $CaCl_2$, are sufficiently stable to be serviceable for use for a couple of weeks.

5. Solutions of dichloramine-T in tetrachlorcarbon of 11% strength showed no signs of decomposition after six months.

6. Halazone is fairly stable and can be stored for one year without serious decomposition. The latter amounts to a loss of about 1% chlorine in the first year equivalent to a decomposition of about $3^1/_2$% of the halazone.

7. Above conclusions on halazone and dichloramine-T refer to conditions, whereby the products are protected from undue action of light and heat.

MONSANTO CHEMICAL WORKS,
ST. LOUIS.

PRESCRIPTION CLINIC.*

BY IVOR GRIFFITH AND ADLEY B. NICHOLS.[1]

In submitting the following list of prescriptions and comments the writers beg to call attention to the fact that they are bona-fide prescriptions and not of the type frequently referred to as arm-chair incompatibilities. It is quite possible to encourage the mind and the hand to formulate prescriptions that would easily present the most freakish incompatibilities imaginable. All of us have seen good journal space dedicated to a ponderous discussion of this type of a

* Presented before Section on Practical Pharmacy and Dispensing, A. Ph. A., City of Washington meeting, 1920.

[1] Department of Pharmacy, Philadelphia College of Pharmacy.

problem, a prescription that even the most reckless prescriber would not have the wit nor temerity to write. As an illustration a British drug journal recently printed the following peculiar mixture and wasted much good space for its consideration:

Acetanilid	40 grains.
Caffeine	20 grains.
Quinine hydrobromide	20 grains.
Bromine water	4 fluidrachms.
Syrup, to make	3 fluidounces.

It may happen that we are unduly critical, but who ever heard of prescribing bromine water in a mixture of this kind and what patient would be willing to take a second dose of such a nauseating mess? Of course it does afford the reviewer of the prescription an opportunity to display a little chemical knowledge by saying that acetanilid and bromine will immediately develop a heavy white precipitate, etc., but outside of that, what practical value is there to a discussion of such an impossible concoction? To our mind it is a good deal more instructive and constructive to spend a little time in studying real prescriptions. Only thus are we able to pass along a little information that may be of value to another who may be called upon to fill a similar prescription. All the prescriptions which will be discussed in the following list are genuine doctor-made recipes and were turned over to the writers by students at the College.

We again beg to call attention to the fact that stress should be laid on the statement that not all incompatible prescriptions are non-dispensable, but that it is very often possible to so modify a prescription lacking harmony that it will thoroughly answer its desired purpose. Then again, we do find what has been termed absolute or true incompatibility when dispensing of the prescription in its original form is out of the question and drastic modification is necessary before the pharmacist can let it out of his hands.

PRESCRIPTION NO. 1.

Zinc oxide,	
Boric acid,	
Bismuth subnitrate,	
Glycerin, of each	2 drachms.
Lanolin	4 drachms.
Phenol	20 grains.
Lime water,	
Olive oil, of each, to make	8 fluidounces.

This prescription, a favorite with a well-known Philadelphia skin specialist, has caused consternation in the prescription department of many a down-town store. In the hands of a clumsy operator it blooms into an untidy mixture not unlike soured cream, while treatment at the hands of the magister turns out a homogeneous velvety cream, perfectly acceptable by the tenderest skin. There are many ways whereby it may be correctly compounded, but the sensible way is to add the zinc oxide, using elutriated powder, to the lime water and shaking thoroughly. To this mixture is added the olive oil, again agitating. The boric acid and bismuth subnitrate are rubbed together with the melted lanolin and the glycerin. The two mixtures are then poured together and thoroughly shaken. The phenol is added last. This procedure results in a fairly permanent cream.

An incorrect way to compound it is to incorporate the lanolin in the olive oil soap and add the glycerin last.

PRESCRIPTION NO. 2.

Strontium bromide	2 drachms.
Fowler's solution	20 drops.
Tincture of belladonna	2 fluidrachms.
Elixir of glycerophosphates	1 fluidounce.
Elixir of gentian, to make	4 fluidounces.

A precipitate occurs no matter how this prescription is compounded, hence we might term it the true type of incompatibility. This precipitation is brought about through the interaction of the strontium bromide with the sodium citrate present in the elixir of gentian, strontium citrate being formed. There is also formed a small quantity of calcium carbonate and possibly other carbonates through interaction of the potassium carbonate in the Fowler's solution, little as it is, with the strontium, calcium and other bases forming insoluble carbonate. The worst offender, however, is the citrate of strontium, which settles in a peculiarly concreted precipitate that stubbornly refuses to mix with the rest of the ingredients.

PRESCRIPTION NO. 3.

Magnesium sulphate	4 drachms.
Sodium salicylate	1 drachm.
Sodium bicarbonate	2 drachms.
Compound infusion of gentian	1 fluidounce.
Water, to make	4 fluidounces.

Without experimentation, one would be inclined to hazard the statement that an incompatibility exists here between the bicarbonate and the magnesium sulphate, with the precipitation of magnesium carbonate. This possibly would be more emphatic if the normal carbonate had been prescribed, although hydrolysis of the acid salt might be expected to bring about the same reaction. Nevertheless on compounding the prescription in the usual way, dissolving the ingredients separately in water and mixing, a clear solution results which, however, on standing develops a precipitate that is quite singular in its appearance. Carbon dioxide gas is also given off and in sufficient volume in time to push the stopper out of the bottle. The most confusing feature of all, however, is that after the evolution of gas is over the crystals have disappeared. Explanation of this phenomenon probably lies in the fact that the crystals are the acid carbonate of magnesium which, like the carbonates of the alkali earth metals, is soluble in carbonated water.

PRESCRIPTION NO. 4.

Berberine hydrochloride	4 grains.
Protargol	15 grains.
Distilled water	1 fluidounce.

This formula for an antiseptic lotion results in a mixture which soon shows the separation of a dark precipitate. There is, apparently, no permissible way of obviating this, since, even with the substitution of the alkaloid for the salt, the same separation occurs. The silver protein compound is not at all well behaved, after the manner of most organic compounds of its type, but acts

very much like the inorganic silver salts. The precipitate observed is silver chloride with what apparently is composed of a silver compound of the alkaloid. The composition of protargol is of such a nature as to make a clear analysis of its incompatibilities quite difficult. Incidentally, the silver protein compounds other than the proprietary behave in a much similar manner.

PRESCRIPTION NO. 5.

Diuretin	15 grains.
Potassium iodide	1 drachm.
Mercuric chloride	1 grain.
Distilled water, to make	2 fluidounces.

Attention has been previously directed to this peculiar prescription, in view of the precipitation which occurs with it. The alkaloidal precipitant formed through the interaction of the second and third ingredients is the well-known Mayer's reagent, which, we are taught, precipitates all alkaloids, except those belonging to the methyl xanthin group and typified by caffeine, theobromine, *et al.* On compounding this prescription, however, while the diuretin is difficult to dissolve, most of it goes into solution, and a nearly clear solution is dispensed which develops quite a heavy precipitate after standing an hour or so. This also happens in the absence of either the iodide or the mercuric salt. The precipitate is the base theobromine which, through the agency of the sodium salicylate in the diuretin, goes into partial solution, but refuses to stay in solution in the presence of either the mercury salt or the potassium iodide. Addition of a few drops of potassium hydroxide solution corrects the difficulty.

PRESCRIPTION NO. 6.

Washed sulphur	4 drachms.
Fluidextract of hyoscyamus	32 drops.
Fluidextract of cascara	4 fluidrachms.
Phenol	4 grains.
Camphor	18 grains.
Menthol	8 grains.
Glycerin	4 fluidrachms.
Liquid petrolatum, to make	8 fluidounces.

One would wonder whether this is not one of the arm-chair type of incompatibilities referred to, and also wonder whether it was meant for hair-dressing or for internal administration as a reinforced lubricant, whatever that may mean. Still, if we should name the prescriber of the peculiar combination the wonderment would increase, for he is one of America's very well-known internists and a man whose prescriptions usually present no discords. How in the world anyone could hope to dispense a sightly mixture and still adhere to the exact formula is beyond our ken. It cannot be done. It is possible, however, with omission of the glycerin and substitution of equivalent amounts of the powdered extracts for the fluidextracts to turn out a product that is not elegant in its appearance but, nevertheless, much better looking and more inviting than the unsightly concoction afforded by the original prescription.

PRESCRIPTION NO. 7.

Chloral hydrate,	
Antipyrin, of each	2 drachms.
Tincture of ginger	2 fluidrachms.
Distilled water, to make	3 fluidounces.

This prescription was submitted to us with the statement that it produced, on standing, a dense yellow precipitate. This was not the case when compounded in various ways. The expected separation of the ginger resins takes place with an additional interaction between the antipyrin and the chloral hydrate, and the separation of a peculiar oily precipitate. This latter separation occurs when, upon mixing the solutions of chloral hydrate and antipyrin, we reach the stage where the antipyrin is no longer in great excess. There is no precipitation in the presence of half the prescribed amount of chloral hydrate. The addition of 10 percent of alcohol partially corrects the difficulty and there is apparently no subsequent separation after standing.

PRESCRIPTION NO. 8.

Ammonium iodide	2 drachms.
Ammonium carbonate	8 grains.
Syrup of wild cherry	1 fluidounce.
Water, to make	3 fluidounces.

An unsightly mixture is the result of compounding this formula as it stands. This is due to a reaction which results between the ammonium iodide and the carbonate, and also with the tannin of the syrup of wild cherry. Strangely enough, ammonium iodide and ammonium carbonate are incompatible, because of the frequent presence of calcium iodide in the ammonium iodide with the consequent precipitation of calcium carbonate, on mixing solutions of these compounds. Then again, ammonium compounds form with tannic and gallic acids a peculiar flaky precipitate. The iodide also disagrees with tannic acid. The addition of some glycerine in place of part of the water ameliorates but does not correct the incompatibility.

PRESCRIPTION NO. 9.

Corrosive chloride of mercury	1/3 grain.
Tincture of chloride of iron	2 fluidrachms.
Lemon juice	5 fluidrachms.
Syrup of wild cherry, to make	2 fluidounces.

There is no incompatibility here, due to the foresight of the prescriber, who prevents the reaction between the iron and tannin of the wild cherry syrup by the intervention of the lemon juice. It is quite possible, however, to have varying intensities of color, depending upon the order in which the mixing is done, as well as upon the amount of citric acid in the lemon juice. This is the type of prescription where the variability of the lemon juice in its acid content makes the dispensing of a uniform article difficult.

The prescriptions were discussed by Messrs. Lascoff, Gray, Scoville and others. A special vote of thanks was given the authors, and they were requested to arrange a similar paper for next year.

"NON-SECRET" VERSUS "SECRET" REMEDIES.*

BY GEORGE E. ÉWE.

The employment of secrecy regarding the identity of the potent ingredients of medicines is a ragged remnant of the ancient mantle of mysticism, with which the medieval alchemists and apothecaries encircled their "potions."

* Presented to Section on Education and Legislation, A. Ph. A., City of Washington meeting, 1920.

A considerable portion of the lay public unfortunately still persists in allowing itself to be influenced by the mystic secrecy with which the manufacturers of some preparations for the treatment of the sick surround their products, but this proportion is decreasing gradually but surely under the steady enlightening efforts being made by the best elements of the medical and pharmaceutical professions. Unfortunately, too, some members of the medical and pharmaceutical professions are misled by this influence of secrecy. On the other hand, usually no objection can be raised to the marketing of any preparation for the treatment of the sick, whatsoever, as long as the label enumerates the potent constituents either qualitatively or quantitatively, and no exaggerated or untrue claims are made for the product.

The stock of practically every retail pharmacist contains preparations for the treatment of the sick, the potent ingredients of which are not stated on the labels or in the literature of the preparations. Neither has the retail pharmacist, as a rule, any knowledge of the essential composition of these preparations. These, then, are "secret remedies." In addition, the stock of every retail pharmacist contains preparations for the treatment of the sick, upon the labels or in the literature of which, statements of the potent ingredients are freely offered, these statements usually being in quantitative form. These are "non-secret" or "open-formula" remedies.

The term "non-secret" or "open-formula," as used in this communication, is not intended to embrace the qualitative and quantitative composition of a preparation to the extent of the flavor, binder, base, vehicle, or other essentially non-potent ingredient, but is limited to the qualitative or quantitative statement of *potent* ingredients. A prescription authorized by a physician licensed to diagnose diseases and prescribe remedies for disease, although of a composition unknown to the consumer, is not a "secret remedy" for the reason that its composition is not secret to the prescriber, who is legally qualified to prescribe any remedy without making its composition known to the consumer. However, legal qualification is required in order to follow this course, and mere knowledge of the potent ingredients of a remedy does not warrant the offering or sale of a remedy for a disease by a person unqualified to diagnose diseases and prescribe remedies therefor. Theoretically, then, the offering and sale of any remedy, and particularly the sale of a "secret-remedy," except upon prescription, or request, by a person not licensed to practice medicine, amounts to the act of assuming the rights of a physician. This theoretical offense is more striking in the case of the offering, followed by the sale, of a "secret remedy" since the indication for the use of the remedy is necessarily stated in terms of a disease, because of the absence of a statement of the potent ingredients, and the offering and selling of such a preparation, except upon prescription, or request constitutes the act of diagnosing diseases and prescribing remedies therefor. This construction is less striking when applied to a remedy of a composition known to the consumer, or the composition of which has been made known to the consumer, or to a "non-secret" preparation, because the knowledge of the potent ingredients enables the consumer to form his own opinion of the efficacy of the preparation, or obtain expert advice regarding the efficacy thereof. The question of diagnosis and prescribing is intimately involved in the discussion of this matter: the ideal condition existing where no

remedies of any nature are offered or sold, except upon the basis of legal diagnosis and prescription. This ideal condition is a matter for future experimentation, if not actually an impossibility, because of the undoubted right of a person to diagnose his own minor ailments and request and administer proper medication therefor. The present immediate step in the evolution toward a more ideal condition is the mere elimination of the "secret remedy," or its elevation into the "non-secret class."

Among the objections to secrecy in regard to the potent ingredients of preparations for the treatment of the sick are:—

Intelligent use is impossible.

Opinions are occasionally so diverse in the realm of materia medica, that the user of a remedy is deprived of his right to his own opinion or knowledge regarding the efficacy of the potent ingredients.

Secrecy induces the possible conclusion that the maker of the product is monopolizing the product for selfish reasons.

Secrecy induces the possible conclusion that the actual cost of the product is entirely out of proportion to its sale price.

Secrecy leads to the temptation to employ potent ingredients, to which objection might be raised if their presence were known to the consumer.

Lack of knowledge of the potent ingredients is productive of pharmaceutical, chemical and physiological incompatibilities, where, as is often the case, the "secret remedy" is employed in conjunction with other medicines.

Secrecy induces the advancement of exaggerated or untrue therapeutic claims, and these claims lead to a false feeling of security upon the part of the consumer, with the possible result of great damage to the consumer, due to induced belief of non-necessity to consult expert advice.

"Secret remedies" are frequently defended by assertions of personal faith in the remedies, but personal faith on the part of the producer, even when of absolutely honest nature, does not warrant the subjugation of the right of the consumer to his own degree or lack of faith.

The "secret" form of remedy and the many temptations and abuses to which it leads are absolutely discountenanced by the ethical elements of the medical, chemical and pharmaceutical professions. The Bureau of Chemistry of the U. S. Dept. of Agriculture regularly notifies, through its Service and Regulatory Announcements, the judgments obtained against "secret remedies" advanced with exaggerated or untrue claims of therapeutic efficacy.

The more successful pharmaceutical, chemical and biological manufacturing companies reject the "secret remedy" policy, and are firm in their adherence to the "non-secret" form of product, and even refuse to manufacture preparations which they know or have reason to suspect are to be marketed as "secret remedies" or "non-secret" remedies with exaggerated or untrue claims.

Various State Chemists, Boards of Pharmacy, and Boards of Health are continually exposing "secret remedies" in regard to their reputed claims, and are educating the lay public in accordance with their findings.

The attitude of the American Medical Association upon the subject of "secret remedies" is typified by the statement in Rule No. 1 of the Official Rules of the Council on Pharmacy and Chemistry of the Association, appearing in the "New

and Non-Official Remedies." This rule is to the effect that in order for preparations to be admitted to the "New and Non-Official Remedies," it is necessary that "for simple substances the scientific name and chemical formula, rational or structural, should be supplied, and for mixtures, the amount of each active medicinal ingredient must be supplied." The reason for Rule No. 1 is stated under "Object of the Rules to be:—

"Protecting the medical profession and the public against fraud, undesirable secrecy, etc." Again, under Rule No. 8 on the subject of Pharmaceutical Preparations and Mixtures, the following statement is made: "it is important that the prescribing physician should be constantly reminded of the potent ingredients, on which the actions of such preparations are based."

The reports of the Laboratory on Chemistry and Pharmacy of the American Medical Association expose many "secret remedies."

The attitude of the British Medical Association is ably expounded in the publications entitled "Secret Remedies" and "More-Secret Remedies," published by the Association from 429 Strand, W. C., London, and is strongly to the disadvantage of the "secret remedy."

The disclosure of potent ingredients has been and is being carefully considered by the law-making bodies of many States and Territories. The Philippine Islands have a Formula Disclosure Law, which is ideal, since it requires the labels of all preparations for the treatment of disease to state qualitatively and quantitatively all of the *principle therapeutic and toxic ingredients*. Louisiana has a Formula Disclosure Regulation, which requires the formula of every proprietary patent medicine sold in the State to be registered with the State Board of Health. While this is an admirable requirement in comparison with a state of total secrecy, yet it is a somewhat objectionable form of paternalism, since it deprives the user of his undoubted right of personal estimate of efficacy and therefore is not to be preferred to a statement of potent ingredients on the label. New York City passed a Formula Disclosure Ordinance, requiring the registration of the names of all ingredients, to which the therapeutic effects claimed are attributed, with the Department of Health. This ordinance was decided against as being invalid in the form presented, although the decision of the Court was of such a character as to be a guide to the Board of Health in re-formulating the ordinance. A notice of appeal from the decision has been served by the State, and there appears to be no reason to doubt that the ordinance will become a law in proper time. These instances, along with the specific legal labeling requirements of the National Food and Drugs Act and various State Drugs Acts are purely indicative of the course of future legislation in this matter, and the ultimate result will, undoubtedly, be the elimination of all "secret remedies" or their elevation into the class of "non-secret" remedies.

The advantages residing in a firm adherence to the policy of "non-secret" or "open-formula" preparations for the treatment of the sick are directly opposite to the objections listed above. In short, the "non-secret" feature permits intelligent use of the preparation; the user is granted his right to his own opinion of the efficacy of the ingredients; any suspicions that the producer is controlling the product for selfish reasons are allayed; any suspicions that the sale price is out of all proportion to the cost of production are allayed; there is no temptation to

employ proscribed ingredients; many pharmaceutical, chemical, and physiological incompatibilities are prevented; there is no tendency to advance exaggerated and untrue claims which react against the health and funds of the consumer; there is no possible subjugation of the right of the consumer to his own degree or lack of faith in the efficacy of the potent ingredients; the more successful pharmaceutical, chemical and biological manufacturers are strongly in favor of non-secrecy regarding potent ingredients, and freely label their products in this respect, always in qualitative form and in quantitative form whenever practicable; the Bureau of Chemistry of the U. S. Department of Agriculture and various State Chemists, Boards of Pharmacy, and Boards of Health, which have charge of the enforcement of the Pure Food and Drugs Act, and the various State laws, are more kindly disposed toward "non-secret" preparations, because of the frankness and spirit of coöperation exhibited by the manufacturer; the confidence of the ethical elements of the medical profession as typified by the American Medical Association and the ethical elements of the pharmaceutical, chemical and biological professions is more readily obtained in a "non-secret" than in a "secret" preparation, and this is also true of the "thinking" lay public. Other advantages are the public credit accorded for contributions of knowledge of the scientific or therapeutic values of the preparations; necessarily high price of a preparation is satisfactorily explained; and responsibility for damages arising from the use of the preparation is divided and not borne in the main by the manufacturer as is necessarily the case with "secret remedies."

Probably the only strong disadvantage which might be raised against the "non-secret" remedy is that the average retail druggist or small manufacturer cannot make his preparations in lots of sufficient quantity and value to permit the expense of an analysis. This objection is overruled by the fact that *qualitative* composition and even *quantitative* composition in the majority of cases can be controlled by careful checking and re-checking of the ingredients and amounts of ingredients used in manufacture, accompanied by qualitative tests to prevent losses of ingredients by precipitation, evaporation, etc., and by accurate control of the yield of the finished product. Statement of quantitative composition is, of course, most desirable, but even a bare qualitative statement removes the preparation from most of the objections surrounding the "secret remedy." The National Pure Food and Drugs Act does not require statement of composition, except regarding alcohol and certain other specified drugs, but where such statement is made it must, of course, be true and unexaggerated. The several State drug laws, to my knowledge, also do not require general statement of composition, but do require statements regarding certain drugs specifically named in the laws. Where the size and value of a lot of "non-secret" remedy permits the expense of analytical chemical or biological analysis, this, of course, should be done. The more successful pharmaceutical, chemical and biological manufacturers maintain departments on a large scale for this purpose, and every effort is made to label each product with the quantitative amount of potent ingredients, as well as qualitative composition, wherever this is possible in the existing stage of analytical, chemical and biological analysis. Where inavoidable losses of the more potent ingredients are experienced by volatilization or precipitation, etc., during manufacture, the manufacture is controlled by chemical or biological analysis so as to

insure the presence of a uniform standard proportion of the potent ingredients in the finished product. As an illustration, consider Spirit of Ethyl Nitrite. This product is subject to inherent loss of Ethyl Nitrite by volatilization during manufacture, but uniformity of the finished product is readily controlled by chemical analysis. When less potent volatile ingredients, such as oil of peppermint in a preparation intended to be prescribed for carminative purposes, are considered, analytical chemical control need only be applied to the establishment of the manufacturing process upon a basis which will insure the presence of a medicinal proportion of the ingredient in the preparation, and the label then merely states the proportion as "approximately" or as "sufficient quantity."

The analytical work connected with the establishment of quantitative label statement of potent ingredients frequently leads to the discovery that many medicinal preparations are subject to some loss of potent ingredients by volatilization, precipitation, progressive chemical alteration, reduction in strength through chemical or enzymic incompatibility, and lessening of viability, etc. It is the earnest concern of the more successful pharmaceutical, biological, and chemical manufacturers to guard against these losses, and furthermore to keep the consumer informed of the best conditions to retard these losses, so as to insure satisfaction in the use of the preparations. This leads to the use of label statements supplemental to those regarding the potent ingredients. Some of these types of label statements are the "date of test," "volatile ingredient," "proper storage and dispensing," "incompatibility," "reduction in strength," "precipitation," "date of expiration," etc. Another result of the analytical chemical, biological and physiological control of label claims is the discovery of improved methods of using, handling, avoiding incompatibilities, testing, etc. These are also freely offered as suggestions on the labels, or in the literature of the preparations as supplementary to the statements of potent ingredients. Some of these suggestions read as follows:

"Keep in a cool, dark place," "Do not bandage over this liniment," "Return for credit after such and such a date," "Do not prescribe in admixture with ——," "After opening, the contents should be transferred to clean vial," "These ..... should only be dispensed upon prescription of a physician," "This product complies with the following tests and standards," etc., etc.

But all this is a logical and admirable elaboration of the "non-secret" remedy idea, and is not to be readily attained without systematic evolution and great effort and expense. The first step in the evolution is the elimination of the "secret remedy," or its elevation into the "non-secret" class, even by mere qualitative statement of the potent ingredients, if facilities for obtaining data for quantitative statements are not available or are too expensive.

The elevation of many "secret remedies" into the "non-secret" class would be to the decided advantage of the remedies, since many of them are distinctly meritorious, and they would receive the support and confidence of an entirely new class of trade in addition to that already enjoyed. The "secret remedies," which would be at a disadvantage when placed in the "non-secret" class, would consist chiefly, if not entirely, of the non-meritorious ones. This is well illustrated by the analyses, which I have made of a few "secret remedies," the results of which are presented below. These analyses and essential formulas are pre-

sented purely as a matter of scientific interest to those interested in pharmaceutical, medical, and chemical subjects. No intention is entertained to expose the formula of any market preparation; in fact, every care has been taken to prevent this by elimination of all identifying names and specific characteristics and quotations. No attempt has been made to carry out the analyses to such a minute and exhaustive stage as to include even the inert ingredients, vehicle, base, impurities, etc., content being had when the total essential ingredients in fair conformity to their quantitative presence, were discovered. In every case where the analyses are translated into the more understandable terms of formulas, these formulas are intended to essentially conform with the analyses and not serve as a basis for the manufacture of fac-simile preparations. No investigation regarding the truthfulness of the reputed therapeutic claims was attempted and all responsibility for any untoward results arising from the practical use of this information as formulas for the treatment of disease is herewith, naturally, disclaimed.

Rheumatic Remedy.

Description.—A pinkish, clear, thin liquid with odor of methyl salicylate and with saline, methyl salicylate taste.

Analysis:—

Potassium iodide	0.834 Gm.
"Other mineral matters"	0.026 Gm.
Methyl salicylate	q. s.
"Other organic matter"	0.03 Gm.
Coloring matter	q. s.
Water, q. s.	100.00%

The "other mineral matters" consisted chiefly of calcium, magnesium, and sodium compounds, evidently introduced by the use of "tap" water, and partly by the use of magnesium carbonate in saturating the "Remedy" with methyl salicylate.

The "other organic matters" consisted of the organic matter constituting the coloring matter. The coloring matter consisted of a pinkish aniline color.

The "Remedy" had a specific gravity of 1.006, was neutral, and was free from alkaline salicylates, alkaloids, and heavy metals.

The "Remedy" could be essentially represented by dissolving 0.834 Gm. of potassium iodide in 100 Cc. water, adding a few drops of methyl salicylate, shaking, adding a trace of pink aniline color to proper shade, shaking, and filtering.

The price of the remedy was 50 cents per 8-fluidounce bottle.

Remedy for Skin Diseases.

Description.—A dark brown, fluorescent, thin, turbid, oily liquid with odor of crude pyroligneous acid and containing a grayish granular powder as a sediment along with a slight amount of red aqueous liquid. The oily liquid portion consisted of a thin hydrocarbon oil, resembling crude petroleum, containing as an addition some certain oily, tarry fraction, obtained from the destructive distillation of wood, with the purpose of presenting a tarry medicament. This oily, tarry portion was similar to "wood-tar-creosote oil." The grayish, powdery sediment consisted practically entirely of sulphur. The dark red aqueous liquid sediment was present in an amount barely sufficient to wet the bottle. It may have been present as water when the "Remedy" was bottled, or it may have been added. It was red and tarry and resembled pyroligneous acid. It was free from alkaloids and plant extractive. The "Remedy" was free from all heavy metals, except a trace of iron. It was also free from alkaloids and left only a very small residue upon ignition, which consisted largely of ferric oxide. The "Remedy," therefore, consisted essentially of a mixture of crude petroleum, "wood-tar-creosote oil," and sulphur. A mixture of 3% of powdered sulphur, 10% of "wood-tar-creosote oil," and crude petroleum q. s. 100 Cc. yielded a preparation resembling the original "Remedy." This "Remedy" sold for 65 cents for a $7\frac{1}{2}$-ounce bottle.

DANDRUFF REMEDY.

Description.—A light brown, thin, clear liquid with complex pyroligneous, arnica-like and rose-geranium odor.

The "Remedy" consisted essentially of a solution of potassium arsenite, phenolic antiseptic (similar to salicylic acid or resorcinol), plant extractive (probably arnica), glycerin, alcohol and water, perfumed and colored a little with caramel or plant extractive.

A solution of 0.5 Gm. resorcinol, 0.05 Gm. potassium arsenite, 15 Gm. glycerin, 15 Cc. alcohol, 5 Cc. tincture (or fluidextract) arnica flowers, oil rose geranium, q. s., caramel, q. s., and water q. s. 100 Cc., produced a preparation essentially *resembling* this "Dandruff Remedy." The price of this remedy was 45 cents for a 4-fluidounce panel bottle.

DENTAL POWDERS RECOMMENDED FOR TREATMENT OF PYORRHEA.

The label of one of the powders claimed that the product was useful in the treatment of pyorrhea, and that it was a powerful antiseptic and germicide.

Description.—A brownish pink powder with wintergreen and sassafras odor, slightly pungent, alkaline, astringent, tarry taste, gritty between the teeth.

Analysis:—

Calcium carbonate	54.72%
Silicate (gritty—probably pumice)	14.10%
Borates (calculated as sodium borate)	5.50%
Methyl salicylate	trace
Oil sassafras	trace
Organic matter, moisture, water of crystallization, etc. (by difference)	25.68%
Total	100.00%

The organic matter consisted chiefly of a tannin and resin-bearing vegetable substance (similar to krameria or catechu) which was soluble to some extent in water to a deep, reddish brown solution. A small portion of beta-naphthol was present. The water of crystallization was in combination chiefly with the borate. Ether-soluble matter was 1.5% and consisted chiefly of the volatile oils and some resin from vegetable substance. The powder was free from emetine and other alkaloids. The dental powder consisted essentially of a mixture of an astringent tannin-bearing substance, similar to krameria or catechu, calcium carbonate, an abrasive silicate, borax, and antiseptics (methyl salicylate, oil sassafras and beta-naphthol).

The price of the powder was 45 cents per sprinkle-top can containing $3^1/_2$ ounces.

The label of the other powder claimed that it was useful against pyorrhea, and all diseases of the gums.

Description.—A buff-colored powder of a somewhat tarry taste and odor and leaving a slight burning sensation when applied to the gums.

The powder consisted of a mixture of calcium carbonate, powdered orris root, powdered calcium sulphate (non-setting), soap, beta-naphthol, thymol, and saccharin. The tarry taste and odor were apparently due to the use of a crude beta-naphthol or a little oil of cade.

A dental powder essentially representing the original was produced by the following formula:—

Powdered orris root	15 Gm.
Precipitated calcium carbonate	50 Gm.
Non-setting calcium sulphate	20 Gm.
Powdered soap (cocoanut oil-sodium soap)	10 Gm.
Thymol	2.5 Gm.
Crude beta-naphthol	1.0 Gm.
Saccharin	0.1 Gm.
Oil cade	3 drops.

The price was 30 cents per 2-ounce perforated-top can.

LIQUID APPLICATIONS RECOMMENDED FOR THE TREATMENT OF PYORRHEA.

The label of one recommended the application for the treatment of pyorrhea, gingivitis, and all diseases of the gums. The label claimed the presence of alcohol and ether.

Description.—A reddish brown liquid with strong cresol or phenol-like odor, caustic to the taste, and giving a burning sensation when applied to the mucous membrane or skin. The preparation was strongly alkaline to litmus and emulsified when diluted with water. The emulsion yielded a deep blue color with ferric chloride.

The application consisted essentially of a solution of phenol or phenolic substance, resin-sodium soap, and essential oils in a mixture of alcohol and water, containing a little ether. It sold for 50 cents per 1-fluidounce bottle.

The label of the second application branded it as a remedy for pyorrhea.

Description.—A mobile, greenish brown, fluorescent liquid, opaque in layers. The odor was complex and suggested acetic acid, chloroform, menthol, eucalyptol, thymol and other aromatics.

Reaction.—Strongly acid.

Analysis:—

Free sulphuric acid U. S. P.	10.19%	by volume.
Free acetic acid U. S. P.	0.478%	by volume.
Alcohol		Present.
Chloroform		Present.
Aromatic antiseptics (menthol, eucalyptol, thymol, etc.)		Present.
Formaldehyde		Present.
Plant extractive (approx.)	31.41%	
Water, q. s.	100.00%	

No evidence regarding the derivation of the plant extractive was obtained. It is possible, however, that the aromatic antiseptics (menthol, eucalyptol, thymol, etc.) were represented in the application by the fluidextracts of their respective parent plants. The application was free from emetine and other alkaloids. Therefore, the application could be represented essentially by a mixture of sulphuric acid, acetic acid, aromatic, antiseptic fluidextracts, alcohol, chloroform, formaldehyde and water.

The price was 45 cents for a 2-fluidounce bottle.

FOOT TREATMENT.

Qualitative analysis revealed the presence of salicylic acid, potassium alum, talcum, starch, and perfume. No boric acid was present.

The price was 20 cents tor $2\frac{1}{2}$ ounces.

HAIR "TONIC" AND DANDRUFF "REMEDY."

Description.—A liquid composed of an upper fluorescent, dark brown, almost opaque oily layer, and a lower deep brown, cloudy, aqueous layer.

Odor.—Pyroligneous, like oil of cade.

Examination of upper oily layer.—Volume.—About 25% of the "Remedy." Contained phenolic substances, hydrocarbons, and tarry matters, and evidently consisted of a mixture of crude petroleum, and a pyroligneous oil obtained as a fraction in the destructive distillation of wood.

Examination of lower aqueous layer.—Acid in reaction, contained phenolic substances, acetic acid, and traces of acetone. Evidently consisted of "pyroligneous acid." Was free from alkaloids, arsenic, heavy metals, borax, thiosulphates, glycerin, chloral, acetanilid, soap, camphor, ammonia, chloroform, and iodine.

The whole "Remedy" apparently consisted of a mixture of the oily and aqueous products of the destructive distillation of wood, to which a little crude petroleum was then added.

A somewhat similar "Remedy" was represented by a mixture of $12\frac{1}{2}$ parts of fluorescent crude petroleum, $12\frac{1}{2}$ parts of "wood-tar-creosote oil," and 75 parts of common "pyroligneous acid."

The mixture was directed to be well shaken before use and applied directly to the scalp and not simply rubbed on the hair.

The price was 45 cents per 5-fluidounce panel bottle.

ASTRINGENT MOUTH WASH.

Description.—A light brown liquid with astringent wintergreen taste.

Reaction to litmus.—Slightly acid after contact with the test paper for one-half hour.

Analysis:—

Anhydrous zinc chloride	0.23%
Alcohol	37.20%
Methyl salicylate	q. s.
Undetermined residue at 100° C. (exclusive of zinc chloride)	0.105%
Coloring matter	q. s.
Water, q. s.	100.00%

The undetermined residue at 100° C. (exclusive of zinc chloride) consisted of a mixture of salicylic acid, beta-naphthol, and coloring matter. The "wash" was free from alkaloids. A faint test was obtained for formaldehyde.

A quite similar "mouth wash" resulted from the following formula:—

Zinc chloride (on anhydrous basis)	0.25%
Absolute alcohol (by volume)	35.00%
Methyl salicylate	q. s.
Salicylic acid	0.02%
Beta-naphthol	0.05%
Formaldehyde	0.03%
Caramel	q. s.
Water, q. s.	100.00%

The "Mouth Wash" sold at 65 cents for an 8-ounce bottle.

HORSE LINIMENT.

This liniment was recommended as a remedy for spavin, ring-bone, shoe-boils, lameness, etc. The label claimed a methyl alcohol content of 46%.

Description.—When well shaken it formed a light brownish emulsion. This soon separated with the formation of a light yellowish layer of oil on top, a small, heavy, dark brown, granular precipitate on the bottom, and a larger and flocculent light brown, very fine precipitate, superimposed on the heavy granular one.

Odor.—Fruity, acetous, camphoraceous, terebinthinate.

Reaction.—Strongly acid.

Examination of light yellowish layer of oil.—Consisted of turpentine and camphor (and possibly traces of aromatic essential oils).

Examination of the mixture of the small, heavy, dark brown granular precipitate and the flocculent, light brown, very fine precipitate.—Consisted practically entirely of ferric oxide in form of rust flakes, and suggested that the liniment was stored in an iron container previous to filling into the market package, although part of the iron content may have been introduced for the purpose of imparting an astringent action to the liniment.

Examination of the methyl alcohol-water layer.—Contained a very small proportion of an iron salt in solution, ammonium salts, traces of rosin, acetates, free acetic acid, camphor, methyl alcohol, turpentine, and a small quantity of iodide. The ammonium salts were chiefly present as acetate and iodide. The traces of rosin were derived from oxidation of the turpentine. The acetates were present chiefly as ammonium acetate. The camphor and turpentine were held in solution by methyl alcohol, and the iodides were present chiefly as ammonia iodide.

Total solids of the complete preparation.—0.82 Gm. per 100 Cc., so that it is evident that the iron salt and ammonium acetate and iodide were present in almost negligible quantities.

Ash content of the complete preparation.—0.115 Gm. per 100 Cc., the ash consisted practically entirely of ferric oxide.

Distillation test of the complete preparation:—

60% distilled between 65–100° C. (largely methyl alcohol).
30% distilled between 100–120° C. (largely water).
5% distilled between 120–145° C. (largely turpentine).
5% distilled above 145° (or was left in the flask as vapor and residue) (largely turpentine).

Acidity of the complete preparation.—Was equivalent to 4.3 Gm. absolute acetic acid per 100 Cc.

Ether extraction of complete preparation.—When evaporated spontaneously, only turpentine and camphor could be recognized by odor.

Alkaloidal extraction procedure applied to 20 Cc. of the complete preparation yielded a trifle of residue, which yielded the merest opalescence with Mayer's Reagent for alkaloids, so that if any aconite, belladonna, or opium was present, the amount was negligible.

Therefore, the liniment consisted essentially of a mixture of turpentine, camphor, ammonium iodide, acetic acid, ammonium acetate, and water.

The following formula essentially represented this liniment:—

Methyl alcohol	46 Cc.
Ammonium acetate	0.5 Gm.
Ammonium iodide	0.5 Gm.
Acetic acid, glacial	5 Cc.
Turpentine	10 Cc.
Camphor	10 Gm.
Water, q. s.	100 Cc.

The product of this formula closely resembled the original preparation in color, odor and general appearance, except that it was free from iron and sediment. It is likely that the ammonium acetate and ammonium iodide were not added as such in the original preparation, but were formed through the use of tincture of iodine, ammonia water, and acetic acid in the formula.

It is needless to say that a preparation of this kind containing methyl alcohol should not be employed as a local preparation even on horses. This examination was made *several years ago*, and this preparation cannot now be located on the market. It is to be hoped that the danger in the use of methyl alcohol in liniments will soon be so well known by manufacturers and consumers alike that the manufacturer will discontinue the use of this substance in his preparations, and the consumer will refuse preparations in which it is present.

The price of this liniment was 45 cents per 8-fluidounce bottle.

WAX FOR APPLYING HEAT FOR THE TREATMENT OF RHEUMATISM.

Description.—A dirty brown, practically odorless, wax-like cake with a faint tarry taste. Melted between 53–55° C. Lost 0.2% at 100° C. for four hours.

Free from saponifiable matters and resin.

The inevitable conclusion was that the substance was a crude paraffin.

The wax was used by melting and painting on the affected part. The remarkable fact was brought out that even at a temperature of 90° C., this wax could be painted on the skin without great discomfort, whereas water at that temperature causes pain. Ordinary U. S. P. Paraffin when rendered anhydrous by heating and stirring at 110° C. yielded practically the same results as this product.

The price of this wax was 25 cents per 4 ounces.

TREATMENT FOR EARACHE.

Method of application.—To be rubbed into the skin surrounding the outer ear but not to be applied directly into the aural canal. Could also be applied sparingly in the nostrils.

Description:—A pale, yellowish brown oily liquid with camphoraceous and eucalyptus odor.

Analysis:—

Volatile oily substances	29.5%
Hydrocarbons	28.8%
Saponifiable oils	41.7%
Total	100.0%

The volatile oily substances included camphor and oil of eucalyptus, and possibly other antiseptic, essential oils were present (such as peppermint, etc.). The hydrocarbons consisted of thin, non-fluorescent liquid petrolatum. The saponifiable oils had a saponification number of 161, and consisted of some odorless, pale yellowish bland vegetable or animal oil, the origin of which was not determined.

The "treatment" was free from alkaloids, phenolic substances, chloral, chloroform, and mineral substances.

The "treatment," therefore, consisted essentially of a mixture of camphor, eucalyptus oil (and possibly other antiseptic essential oils), liquid petrolatum, and some vegetable or animal oil or oils.

A treatment resembling the original would have the following formula:—

Camphor 26.5 Gm., oil eucalyptus 3 Cc., oil peppermint 0.5 Cc., light liquid petrolatum 30 Cc., and nucoline (a form of deodorized cocoanut oil, possessing strong resistance to rancidity) 40 Cc. Warm until complete solution of the camphor takes place or until the mixture is saturated with camphor.

The original "treatment" sold for 50 cents per 3-fluidounce bottle.

APPLICATION USED IN THE LOCAL TREATMENT OF SPAVIN IN HORSES.

Description.—A thin, mobile, dark brown liquid, readily volatilizable, leaving a dark, sticky mass.

Odor.—Composite, in which could be detected pine tar, thyme, peppermint, turpentine, and probably camphor, eucalyptus, tansy, etc.

Was not miscible with water, but readily miscible with alcohol and ether.

The following mixture possessed essentially the same composition as the original application:—

Oil pine tar	7.0 Cc.
Alcohol	1.5 Cc.
Oil peppermint	4.5 Cc.
Oil turpentine	14.5 Cc.
Oil eucalyptus	7.0 Cc.
Oil thyme	2.0 Cc.
Oil tansy	3.0 Cc.

Mix.

Record of the price of this preparation cannot be located.

ANTISEPTIC SHAVING LOTION.

The label claimed that the lotion was useful as an antiseptic after shaving, and would allay irritation.

Description.—A pale pink, faintly turbid, aqueous liquid with rose odor.

Analysis:—

Borax, approx	1.5%
Sodium carbonate (crystal), approx	0.5%
Tragacanth, approx	0.1%
Pink coloring matter	trace
Rose water, q. s	100%

A quite similar preparation was prepared by mixing the ingredients mentioned in the analysis and allowing the mixture to stand for 24 hours with occasional shaking and filtering.

The price of this "lotion" was 45 cents per 8-fluidounce bottle.

HEART MEDICATION PLASTERS.

A "heart disease" plaster consisted of a muslin base, upon which was spread a brown mass with an aromatic and cinnamon-like odor.

The brown pasty mass consisted of a wheat flour paste, containing spices. The spices identified were cinnamon, nutmeg and cloves.

The plasters, therefore, consisted essentially of a modification of the time-honored "spice-plaster" and evidently depended upon counter irritation for any action which they may have possessed.

The price was not ascertainable as the plasters formed part of a "course of treatment."

Numerous other commercial "Remedies" were examined during this investigation, but were placed in the "non-secret" class, because of the frank statement of one or more, or all potent ingredients, on the labels.

Some of the "secret remedies" are, undoubtedly, meritorious, and would profit by their elevation to the "non-secret" class. For analysis of other "secret remedies," the reader is referred to the *Service and Regulatory Announcements* of the Bureau of Chemistry of the U. S. Department of Agriculture; the publications of State Chemists, Boards of Pharmacy, Boards of Health, and other State bodies (particularly the publication of the North Dakota Agricultural Experiment Station); "Secret Remedies," and "More Secret Remedies," of the British Medical Association; the reports of the Laboratory on Pharmacy and Chemistry on the American Medical Association; and various medical and pharmaceutical periodicals.

The elimination of "secret remedies" or their elevation into the "non-secret" class is in process of evolution, is inevitable, and to the advantage of all concerned.

It is to be earnestly hoped that the undoubted advantages to be derived from the success of this movement will be appreciated by all concerned and that every possible assistance will be rendered toward the achievement of this success.

PHARMACEUTICAL RESEARCH LABORATORY,
H. K. MULFORD CO., PHILA. PA.

MEETING CHAIN STORE COMPETITION.*

BY CLYDE L. EDDY.

Figures compiled during the spring of 1920 by *The Druggists Circular* show that there are in the United States 315 individuals and corporations operating chains of three or more drug stores. These chains include a total of 1,565 stores—approximately 3.12 percent of all the drug stores in the country.

Twenty-one of these individuals and corporations operate chains of ten or more stores and one of them, the Louis K. Liggett Company, has 211 retail establishments scattered between Bangor, Maine, and Dallas, Texas. This group of 21 organizations, operating 544 stores, includes the following companies:

The Louis K. Liggett Company, of New York City	211 stores
The Owl Drug Company, of San Francisco, Cal	32 stores
The Mykrantz Company, of Columbus, Ohio	30 stores
The Dow Drug Company, of Cincinnati, Ohio	23 stores
The National Drug Stores Corp., of New York City	21 stores
The Walgreen Drug Co., of Chicago, Ill	21 stores
The Marshall Drug Co., of Cleveland, Ohio	20 stores
The Miller-Strong Drug Co., of Buffalo, N. Y	19 stores
The Sun Drug Co., of Los Angeles, Cal	17 stores
The Standard Drug Co., of Cleveland, Ohio	15 stores
The United Chemists' Corp., of New York City	15 stores
The Scholtz-Mutual Drug Co., of Denver, Colo	15 stores
Clem Thistlewaite, of Indianapolis, Ind	15 stores
The Day Drug Co., of Akron, Ohio	15 stores

* Read before Section on Commercial Interests, A. Ph. A., City of Washington meeting, 1920.

Shumates Pharmacies, of San Francisco, Cal	12 stores
Harvey and Carey, of Salamanca, N. Y	12 stores
The Coöperative Drug Co., of Philadelphia, Pa	11 stores
The Jacobs Pharmacy Co., of Atlanta, Ga	10 stores
Paul Freund, of New Orleans, La	10 stores
The Detroit Drug Co., of Detroit, Mich	10 stores
The May Drug Co., of Pittsburgh, Pa	10 stores

Remember this group of 21 chain organizations I shall refer to it again.

It will be noted that the "home offices" of 273 of these stores are in New York; 103 are in Ohio; 61, in California; 21 each, in Pennsylvania and Illinois; 15 each, in Indiana and Colorado; and 10 each, in Michigan, Georgia and Louisiana. These are the larger chains only. There are smaller chains in nearly every state, the only ones which are free from them being South Dakota, Wyoming, New Mexico and Arizona. Naturally most of the chains are found in the more thickly populated sections of the country and, especially, in the larger cities. Three drug stores of every hundred in the United States are *chain* drug stores.

ORIGIN OF THE CHAIN MOVEMENT.

The chain store is a product of our own times. As we understand the term, there were no chain stores in existence as recently as thirty years ago and practically all of the growth of the movement has been during the past twenty years. Prior to 1890 there were isolated instances where an individual operated two or more stores but they were all in the same city or neighborhood and were simply two stores under the same management. They were separate entities and there was no home office or central organization.

In 1900, the old Hegeman Company had four stores in New York; the Riker organization had two stores in the same city; Jaynes had two or three in Boston; and the Owl had three in California. These and perhaps a dozen others of less importance constituted the sum total of chain stores in the United States. Twenty years ago there were not more than 25 stores in the country which could be called chain stores—today there are 1,565 of them.

The Louis K. Liggett Company was not organized until 1907 and was operating but 26 stores three years later. At that time the Riker-Hegeman-Jaynes combination had 58 stores and the Owl had ten. That was in 1910. Six years later when the Liggett Company absorbed the Riker-Hegeman-Jaynes Company, the purchasing corporation was operating 45 stores and the selling corporation, 107. The Owl at that time had 21 stores. That was 4 years ago.

The Mykrantz Company was organized as recently as 1912 and now operates 30 stores. The Dow Drug Co. was organized in 1915, taking over the 11 stores of the M. C. Dow Company and the three stores of the Weatherhead Company, and now operates 23 stores. The Marshall Drug Company had but one store in 1900 and now it has 20. The Miller-Strong Company, with 19 stores, was not organized until 1908 and the Sun Drug Company, with only one store in 1901, served twenty-eight and a half million customers during 1919 in 17 stores.

The Standard Drug Company had one store in 1900, three in 1905, and 16 in 1919. The Scholtz-Mutual Company was organized only last year, taking over the seven Scholtz stores in Denver and adding seven more to them. In 1900 the Day Drug Co. was operating one store and the Jacobs Pharmacy Company two. The first of the Peoples' drug stores was opened in 1907.

The National Drug Stores Corporation was organized in 1919—only last year—and already is operating 21 stores. The United Chemists Corporation, the drug chain, if you will, of the United Retail Stores Corporation, the largest and wealthiest retail organization in the world, has been in existence only a few years and has only recently begun actually to expand. We may expect to see it number its stores by the hundreds within a few years, if the past performances of the company are used as a criterion.

WHY THE CHAIN STORES CAME INTO EXISTENCE.

There is no denying the fact that the chain store movement has been, and is, a successful one and it may be worth our while to inquire into the reasons for its success. Chain stores came into existence during the heyday of the old-time "patent" medicine and their *initial* success, undoubtedly, was due largely to their policy of cutting retail prices, but that alone did not, and does not altogether account for their success.

R. E. Miller, of the Owl Drug Company, says that chain stores, or at any rate the chain of stores of which he is president, came into existence because he saw an opportunity to duplicate, in San Francisco, a type of store then meeting with success in Philadelphia.

"The drug stores of the Pacific Coast were called apothecaries' or chemists' shops in those days," he says. "The windows contained a few flower pots but the old style colored drug symbols occupied most of the space. In the interior of the store everything was under cover, the shelves being filled with stock bottles on which Latin names were printed. The stores were cold and cheerless.

"Some of the department stores were just beginning to feature sundries and were gradually taking the business which I knew rightfully belonged to drug stores and I saw that if druggists insisted upon sticking to the old order of things they would soon be crowded into the suburbs. I was much impressed with the store of George B. Evans, in Philadelphia. His place was large and roomy; the windows were clean and well trimmed; and he dared occasionally to cut a few prices and use some printers' ink in his advertising. Each time I went East I noticed that his business was increasing and as often as I returned to San Francisco (Mr. Miller was then buyer for a wholesale sundry supply house) I tried to tell a few of my best customers something about his business methods, but they termed such methods 'unethical and improper' and would have nothing to do with them. I saw an opportunity to duplicate Mr. Evans' type of store in San Francisco and did so, our first store being opened June 1, 1892."

Mr. Miller was a price cutter and the earlier success of his company was due in part to that policy but there were other things and there are other things, of far greater importance than price, responsible for the success of the chain store movement. The public may think it cares a great deal about price but it will not go a step out of its way to trade at the low-price store that is dirty or dingy, or the one that gives unsatisfactory service, or the one in which it has no confidence.

The success of the chain store is the result of its having won the confidence of the buying public; upon its merchandising ability; and upon its location. Perhaps the most important of these is that it has won the confidence and has the good-will of a large proportion of the buying public.

WINNING CONFIDENCE THROUGH HONESTY.

HONESTY IN SELLING.

Unfortunately, there are certain smaller chains of stores whose owners, apparently, do not think that "honesty is the best policy" but the larger chains—the more successful ones—know that it is and they do business accordingly. What I have to say, therefore, may not apply to all chains but, from personal experience and investigation, I know that it does apply to the larger ones.

They make it a rule to refund the money, *cheerfully*, when a customer brings back an article that he has paid for and is not satisfied with. They go out of their way to make the customer feel that the goods must give satisfaction. This is typical of the instructions sent out by the better type of chain-store organizations;

"Do not quibble or question when a customer brings back a Riker package and says the contents were not satisfactory. Hand out the purchase price promptly and as willingly and graciously as you do when you sell it. Living up to our guarantee is our salvation and your salvation. Do not misrepresent us. We advertise as follows: 'If a Riker preparation fails to satisfy you, bring back the empty package *and get your money*.' We mean just that and when you hesitate or question it you are creating a doubt in the mind of the customer as to our honesty. *Regardless of any other consideration—the customer must be satisfied.*"

Think of the fine courage required to send such a sweeping statement of policy out to 150 stores. Think what a tremendous monetary loss might result from the application of such a policy. Yet, such a policy is adhered to by many of the more successful retailers in all lines.

I have been on the floor myself in Owl stores and have had disputes referred to me by over-zealous salesmen who were unwilling to be imposed upon by unreasonable or unwitting customers seeking to exchange items not even purchased there. And I have made such exchanges quite confident that I was making a friend for the store and acting in accord with the wishes of the management.

I have seen tooth brushes brought back—tooth brushes that were purchased elsewhere—and I have exchanged them for new ones without ever letting the customer know that I doubted his honesty and *giving him no opportunity to doubt ours*. Perhaps this "money back" privilege is abused sometimes but you have no way of knowing when the customer is not honest and it is better to be the "goat" occasionally than to shake the confidence of the bona-fide customer by refusing to take back merchandise he honestly thinks came from your store.

Also, the guilty conscience of the customer who abused your confidence may send him back to make reparation by purchasing other merchandise and, in the long run, will refund you the money you lost on the original "exchange."

Finally—and especially—make refunds and exchanges cheerfully or do not make them at all. When you frown about it and seem displeased you lose both the money and the customer whereas, when you smile, you are out the money but you retain the good-will of the customer and are assured of his continued patronage.

THE CUSTOMER IS RIGHT.

Marshall Field is said to have been the first merchandiser to adopt the policy that "the customer is always right." Thousands of them employ a similar policy now. This is how the old Riker company expressed it; "The first principle of the 'Riker Idea' is that every transaction in a Riker store must be completely satisfactory to the customer. There will be no compromise, no quibble—right or wrong, the customer is *right*. Cost what it may in money, cost what it may in the personal feeling or dignity of the representative, the customer is *right*."

Those are strong words and all of us know how very difficult it is to adhere to such a policy. We have all encountered unreasonable, snobbish, overbearing customers who deserved not kind consideration and tactful handling, but swift, effective and unmistakable assistance out of the door and on into the middle of the next block, but it has been amply demonstrated that it isn't good business to follow our inclination in such cases.

I have had customers come to me fairly "tearing their hair" accompanied by red-faced salesmen in a humor to bite "ten penny" nails in two and I have seen those same customers leave the store a few minutes later quite placated and loaded down with purchases the profits from which offset the monetary loss incurred in restoring the smiles to their faces.

SELLING WHAT THE CUSTOMER ASKS FOR.

Some of us can remember the "good old days" in the history of retailing when the idea was to "sell 'em your own merchandise, no matter what they ask for." Some of the small retailers still do it that way—and that is one of the reasons why they will always be small. The customer kept one eye on the door and all that was lacking to make the scene complete was a horse and a mask.

But, in the drug business at any rate, there is little of that nowadays and many of the better stores do not permit so much as a suggestion of their own brand when the product of another manufacturer is asked for. The Owl Drug Company advertises, "You get what you ask for in an Owl store—there is nothing 'just as good,' " and means exactly what it says. If you ask for a proprietary that is what you get, and if you want to take a chance on "Wuxated Zinc," you take your chance all unhindered. Salesmen who try to "switch" customers to "P. M." goods are peremptorily discharged. A glib salesman can sell almost anything he may set out to sell, but such items do not always stay sold, and it is better business to sell the customer what he wants and then—sell him something else to go with it.

SALES CLAIMS.

One of the larger chain organizations instructs its salespeople as follows: "Misrepresentation of merchandise is suicidal to any business. We must insist that you never misrepresent any article under any circumstances," and another one says, "Misrepresentation of any article offered for sale is strictly forbidden. The good faith of this company is largely in the salesmen's hands and this confidence must not be betrayed. Tell the customer exactly the truth about each article."

Undoubtedly there are salespeople who stretch the truth in order to make sales but that is the uncontrollable "human element." The instructions are clear and, where the *spirit* of the organization is for square dealing, the general *tone* of the company is one that encourages confidence.

One corporation advises, "You should not misrepresent ours or any one else's goods; neither should you guarantee any cures." That tends to correct any tendency to discourage the sale of outside products in favor of commission goods and, also, it urges that no exaggerated claims be made for the goods on sale.

HONEST MERCHANDISE.

First sell your business to your own sales-force. Be careful in your buying so that your stock will include only merchandise that you will feel safe in recommending and then let your salespeople know that your merchandise has your personal guarantee back of it. One of the larger chain organizations says, "Confidence in the value and quality of the article you are selling is necessary. That we believe thoroughly in goods we recommend is shown by the fact that we are willing at all times to refund money to dissatisfied customers," also, "We assure

customers that if at any time an article of our manufacture is not satisfactory, they are at liberty to return it and have the purchase money refunded to them."

Such a policy necessitates extreme care in buying and, for that reason, in some instances, any new article being added to stock must pass inspection by six or seven different men or departments. The application of such a policy does two things; it demands careful buying and it, ultimately, assures the customer that he or she is perfectly safe in buying from the company, and the average customer makes his *big* purchases from stores in which he has that confidence.

HONESTY IN ADVERTISING.

Advertising, to be effective, must be truthful—over a long period of time. The first impulse of the American public is to discount advertising statements. Too many advertisers exaggerate the quality of the wares or quote special prices that are special in name only. The larger, more successful, reputable concerns do not permit the use of the term "special" as applied to a price unless that price is lower than the regular, established price, and, for that reason, when they advertise a special sale the people go there, confident that they are going to get standard goods at reduced prices. A quarter-page advertisement of reduced prices in the men's clothing department of the John Wanamaker store will attract hundreds of men to that department while a full-page spread of several other concerns that I might mention will not cause a ripple of excitement.

The larger stores do not buy up a lot of inferior merchandise in job lots and then attempt to dispose of it as first-class material—they put it in their "bargain basements" and label it according to its quality.

The advertiser backs up his advertising statements. A well-known eastern pharmacist on a trip west one time saw what appeared to him to be an exceptionally good money purse displayed in an Owl window with a 25-cent price tag attached to it. He went in and asked to be shown that particular purse and when the obliging manager took it out of the window he discovered that a mistake had been made and that the actual price of the purse was $1.25. The prospective customer accepted the explanation and was willing to give up making the purchase but the manager insisted that he take it for 25 cents if he wanted it—it was advertised at that price and at that price it would be sold.

So far as it is possible, no statements are made regarding service features unless those statements can be and are backed up by service in the stores. If the advertisement says "all prescription bottles are neatly capped," a determined effort is made to have prescription bottles capped, and if the soda glasses of the store that advertises "all glasses are washed in soap and water and carefully dried after each service" are not so washed and dried the fault is with the dispenser and not the management.

Honesty in advertising is essential to confidence and the advertiser who does not have the confidence of the people might better not advertise.

HONESTY IN THE PRESCRIPTION DEPARTMENT.

Here again, I want to make it clear that I refer to the more reputable chain organizations—the ones that are successful pharmacists as well as merchandisers.

One of the most successful chains in the country has the following sign prominently displayed in each of its stores: "Instant Dismissal Is the Penalty for Sub-

stitution," and it means exactly what it says. It may be that the signs are displayed partly for the effect they will have on the physicians and the patients, but, also, they serve as constant reminders to the prescriptionists and create confidence in the minds of everyone who reads them.

If A. Co's. fluidextract of ergot or some other firm's compound syrup of squill is ordered by the physician, that is what is dispensed. A little thing perhaps and something that can be said as well of thousands of independent stores but a potent factor in building trade—through public confidence—when advertised to the people through the newspapers and to patients and physicians, *through the men who work in the prescription departments.*

ETHICAL HONESTY.

The chain organization frequently is not only honest but is too scrupulous to sell many items which it has a perfect right to sell. I remember a number of years ago when one of the chains threw out all of its "cures" for epilepsy and remedies for certain other ailments which should be treated only under the direction of a competent physician. This action caused no little financial loss but it increased the confidence which the salesforce had in the company and must have, ultimately, had a like effect upon the company's customers.

The same company did not permit its salespeople to recommend heart remedies, depilatories, remedies for sore eyes and medicines for children. Then, it discontinued the sale of liquors and venereal remedies—and this was long before there were any restrictions on the sale of either of them.

Despite the privilege granted by the pharmacy law of the state in which most of its stores were located, the company discontinued the sale of the following items except on prescription: powdered cantharides, tincture of cantharides (except in hair tonics), oil of savin, oil of pennyroyal (except in flea drivers), paregoric, fluidextract of cottonroot, fluidextract of ergot (except with maternity supplies), fluidextract of tansy, oil of rue, oil of tansy, cottonroot bark and emmenogogue pills. And this was several years ago when there were no bans of any kind against the sale of paregoric.

Counter prescribing has been forbidden in its stores since the organization of the company.

ADVERTISING THEIR POLICY.

Then, these corporations let the public know that they are honest, dependable pharmacists and merchandisers. They advertise the fact in the newspapers, but, more particularly, they advertise it through pleased customers who have had occasion to take some article of merchandise back for exchange or refund, or through pleased customers who know that merchandise must give satisfaction or it need not be kept by them.

They advertise through pleased customers who know that they will get what they ask for without quibble or question, through pleased customers who know sales arguments are based on facts and that the merchandise is of good quality. They advertise through pleased customers who know that the advertising is dependable, and through pleased customers who know that prescriptions are filled as they are directed to be filled. Finally, they are advertised through a contented and enthusiastic salesforce which has confidence in the merchandise it is selling and imparts that confidence to the customers.

A recent experiment conducted by a chain organization showed that 90 percent of its customers patronized the company because they had confidence in its honesty and ability. We have seen what the chains do to prove their honesty; now let us see what they do to show their ability.

PROFESSIONAL REPUTATION AND ABILITY.

Do not get the impression that the chain stores do not compound prescriptions—last year two companies alone filled more than two million of them.

The chain stores are tremendously handicapped through a lack of *personality* in their prescription departments. When we have a prescription filled we want to take it to a druggist with whom we are acquainted—we want to feel that he compounded it personally. After having a heart to heart talk with the physician we are loath to take the prescription he gives us and hand it over to a clerk in a store and see him whisk it off somewhere in a dumb waiter. The process is too mechanical. Yet, the chains fill millions of prescriptions every year.

Lacking the personal touch, they take other means to impress the customer. They record his name and address very carefully on a printed form and give him a tag, numbered to correspond with a number on the form which accompanies the prescription to the prescription department. Then, they tell him exactly how long he will be required to wait for the medicine and, when it is completed, the numbers are checked and the medicine delivered.

Compare the effect upon the customer of such a system as compared with the too-prevalent custom in smaller stores of ripping a piece of wrapping paper off the roll and scribbling the name on that and sending it back with the prescription which is to be filled.

Also, when the prescription is to be delivered, it is given preference and is delivered ahead of less urgent packages. This is customary in thousands of independent stores and deliveries are made promptly but the chain gets some valuable and impressive advertising out of it by the simple expedient of placing on the package a string tag reading "Prescription—Deliver Immediately."

Some of the larger chains are making no special effort to get prescription business. They do not make deliveries and conduct the prescription department as a sort of "necessary evil," but others of them consider this department as important as any in the store and make every effort to establish a reputation for skill and ability. Their galenicals, usually, are made up at central laboratories and they do not hesitate to employ chemists and pharmacists who have established reputations. Their prescriptionists are well-paid, well-trained pharmacists and the departments they conduct, very frequently, are credits to the profession.

Then, having an excellent product, they do not cheapen it by dispensing it in a slip-shod manner. There is no doubt that medicine dispensed from a bottle with a soiled, hand-written label or from a box that looks the worse for wear, may have the same potency as that which is delivered in a neatly capped bottle bearing a typewritten label or from a handsome box that shows care and thought in labelling but there is a psychological effect there that is worth considering. The neat package has the *appearance* of having had more care, thought, *skill*, expended upon it and the appearance counts for much in such a case.

Finally, the chain store enhances its professional reputation through the manner in which it dispenses crude and household drugs. First, they are careful of the quality of the drugs they dispense, sometimes aging their own cascara bark, re-sifting their senna leaves, etc., and, then, they realize the value of appearance again and dispense only in neat, dust-proof cartons which advertise their stores so long as the packages remain in the medicine chests where the purchasers place them.

PRESERVE THEIR IDENTITY AS DRUG STORES.

The average chain drug store looks like a drug store. Recently I made a study of the fronts of twenty-five drug stores along a much-travelled street in New York City. All but four of those stores looked more like hardware or candy stores than drug stores. The words "drugs," "prescriptions," etc., were subordinated to the names of proprietary remedies, safety razors, proprietary soda fountain beverages or theatrical make-up. The principal advertising on the front windows of twelve of them was for a safety razor. Four of them displayed exactly the same sign that the candy stores along the way displayed and five of them flaunted proprietary medicine advertisements to the exclusion of almost everything else. It remained for the chain store and three others of the twenty-five to show such signs as "prescriptions," "drugs," "sick room supplies," "rubber goods" *and the name of the store.*

Too few stores show the name of the store or the name of the proprietor. Customers frequently stand in front of such stores and say, "Whose store is this?" Notice that the larger chains never put in a display that does not include the name of the company.

We have been several generations informing the public that safety razors, theatrical make-up, soda water and proprietary remedies can be obtained at drug stores—why try now to tell them that the drugs are secondary to the other items. We are not hardware or candy stores carrying drugs, but drug stores carrying these other items as side-lines. The tail is beginning to wag the dog.

MERCHANDISING ABILITY.

There is much that could be said on this subject. Perhaps the success of the chain movement is due *principally* to the ability of chain-store owners to sell merchandise, but space does not permit me to go into detail on a subject of so much importance. Furthermore, the story already has been told and is being told every day—in the stores operated by the chain organizations.

They build light, airy stores and conduct their businesses with the idea of disposing of merchandise at a profit. They spend thousands of dollars every month on window displays and on displays inside of the store. They tell their salespeople how to greet their customers and how to sell them *more than they came in to buy.* That is the secret. Selling something in addition to what the customer came in to purchase. This they do through displays of seasonable merchandise at reduced prices but, more particularly, through the suggestion of "running mates."

There is hardly an item in the drug store that has not a "running mate." Tooth brushes suggest tooth pastes, soap suggests wash cloths, finger nail polish suggests nail buffers, cameras suggest films, face powder suggests chamois skins

or powder puffs, and so on throughout the entire stock. There are no less than thirty different items which might be advantageously suggested with a cake of shaving soap, and any thoughtful salesman can think of items which might accompany almost any item for which he may have a call. Through this "running mate" policy one of the western chains has increased its average sale nearly 30 percent in the past two years alone. And the added items are usually the profitable ones.

We cannot afford to be poor merchandisers—unless we are willing to give up all but the strictly professional work to the chain stores. And there is no need for us to do that. There is no good reason why the pharmacist should not be a skilful merchandiser as well as an able professional man and it is becoming apparent, with the continued growth of the chain organizations, that more thought must be given to improving our merchandising facilities.

BUSINESS DONE BY CHAIN STORES.

Twenty-eight years ago there were no chain stores in the United States—to-day there are 1,565 of them. To gain some idea of their phenomenal growth we have but to consider that a group that operates 451 stores had but 25 in 1900; 64 in 1906; 189 in 1912; and 344 in 1918.

The group of 21 companies described at the beginning of this paper did $76,000,000 worth of business in 1919—six percent of all the drug business done in the United States. Four one-hundredths of one percent of the owners did six percent of the business.

FACING THE FACTS.

We must face the facts as they exist. To close our eyes to them is folly. The chain-store movement is in its infancy and yet it already has tremendous proportions. We must combat the movement by becoming better merchandisers.

We must let the people know that we are prepared to give service in every department of our stores that is as good as can be found anywhere. We must formulate store policies and set them down in black and white for our salespeople and customers to study.

We must make a special effort to win and hold public confidence. We might profit from a "money back" policy—advertised in every transaction that occurs in our stores. We must let it be known that goods must please and that exchanges or refunds are made cheerfully. Regardless of other considerations—the customer is right.

We must not permit our salespeople to advertise competitive merchandise by "knocking" it nor must we permit our clerks to discourage the sale of items that are asked for. We must buy with extreme care so that we can sell quality merchandise at low prices and we must advertise in a manner that cannot mislead prospective customers as to the quality of the goods being advertised.

We must advertise the prescription department by giving better service there and by conducting transactions with the deliberate intention of impressing our customers with the quality of our goods and material and the ability of our prescriptionists.

We must preserve our identity as drug stores and we must sell more "running mates."

Finally, we must inject more of our own personality into the business. Our customers are more than customers—they are our clients and they demand our personal attention. There is no store where personality counts for more—we must give our own services—without stint.

THE CHAIN STORE.

ITS INFLUENCE ON PHARMACY, AND IN GENERAL. DESIRABLE LEGISLATION.*

BY FRANK H. FREERICKS.

Years of occasional study and thought have brought me to conclude that the "Chain Store" is an evil; its claimed advantage to the public infinitesimal, as compared with the harm which it imposes. This in my opinion is true, not only in retail pharmacy, but it is generally true. I do not ignore the claimed advantages, and admit there may be some, but these are disproportionately with the Chain Store owner, who is bringing into retail business an attempt to monopolize —to secure more than a fair share. It will be my endeavor in this paper first to briefly point to the harm which I believe is done to retail pharmacy, in particular, by the Chain Store, and then to the harm to it in common with all other lines, or, to be more exact, the public harm.

It is my claim that true pharmacy and its up-holding rests substantially upon the ideal, rather than the material; that the Chain Store, in pharmacy, is concerned only with the material—the need of money gain. It, consequently, is destructive of the ideal, and, as it continues to grow, it reduces the opportunity for true pharmacy. The spirit of public service, of serving humanity, other than as a means to better attract dollars, cannot be known or exercised by the Chain Store owner. It is dollars he wants, and the method that best brings the dollar must always be his method. In passing, it may not be out of place to touch upon the thought, more or less frequently expressed, that good may come to pharmacy out of the Chain Store, because it tends to educate the public in learning to discriminate, and in becoming more ready to support "exclusive pharmacies," so that their establishment would thus be encouraged, but I see little chance for this. It is possible that the commercial instinct will induce the Chain Store owner in the larger cities to establish Central Depots or one Depot, for the compounding of prescriptions, but then his other stores will be made feeders and way-stations. The Chain Store owner knows too well the value of a pharmaceutical mantle—that prescription and strictly pharmaceutical work gives him standing, which otherwise he would not have, and either directly or indirectly brings profit to him. As derogatory influences which I believe the Chain Store to have, particularly on pharmacy, I would enumerate the following:—

1.—The Chain Store owner, if he happens to be a trained pharmacist, allows his professional training to become entirely submerged by his pursuit of commercial success. The trained pharmacists employed by him are kept so busy with

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the every-day machine-like routine laid down by the rule of dollars and cents, that they are, or become, entirely removed from a desire for higher and better things in pharmacy.

2.—Noticeable trend and desire, at least in the larger cities, to place American pharmacy upon a more professional basis is hindered and retarded by the purely commercially minded Chain Store owner, who with his astute method of using printer's ink, educates the public mind to look for its prescription and pharmaceutical work, where doll babies, alarm clocks and lunch counters are a considerable stock in trade.

3.—It may fairly be estimated that the drug and drug accessory output of every Chain Store is on an average equal to the output which will maintain five fair-sized independent pharmacies. This business of every Chain Store is carried on largely with unregistered floor help and, as a rule, is under the supervision of two or three registered pharmacists. Thus every Chain Drug Store replaces or prevents the existence of five regularly conducted pharmacies, each owned by a registered pharmacist, having in his employ at least one other educated registered man. The three registered men used in conducting one Chain Store take the opportunity of existence from ten registered pharmacists, under normal and desirable conditions. The net loss to the public and to pharmacy is the activity of seven educated men, usually a credit to the community and adding to its cultural life. The activity of ten men in pharmacy and pharmaceutical work, (who each would have a direct personal interest in it, and at least some leisure time while on duty, for experimental work, some of whom would use that time and some of whom would become engaged in Association activity and its post-graduate work), is made impossible by the existence of every established Chain Drug Store.

Turning to the Chain Store as a system in all lines of retail business and endeavor, the harm which is of a public nature—of a general nature—becomes far more extensive and destructive in its scope. In order to truly measure it, we will not overlook its claimed advantages. Usually these are summed up, or may be summed up, in the economy of large output and large purchasing power which presumably goes to the consuming public; rapidity of turn-over, assuring fresh stock; cleanliness and attractiveness, at least in appearance. It seems to me, that the economy of large purchasing power and turn-over is more than offset by the high rental and expensive location and equipment, and by the waste which is always found where immediate personal supervision is lacking. Large turn-over and a greater consequent freshness of supply is only a seeming advantage because to this time the field of the Chain Store has been in the larger cities and the close proximity of jobbing and wholesale houses, the need to buy only in small quantities, assure an equally fresh supply for the business having smaller output. Special attractiveness, neatness and cleanliness, if they exist out of proportion, seem to be more superficial than real. It may be for the eye, but is it in fact? After every claimed advantage which the Chain Store professes to give the public is given consideration it may substantially be reduced to the one which professes to enable the public to buy more cheaply. It is true that the Chain Store has set the pace in the cutting of prices, and if this is creditable from any point of view, the credit must be allowed it, but is it really worth-while? To find the correct answer we cannot take the isolated individual who buys some

well-advertised proprietary at cost, and saves 33 cents, or many times 33 cents on such collective isolated purchases, but from the public point of view we must include the whole output and all the purchases; we must include the purchase of needless things which is induced by cut-rate attraction on some leader, and when it is all summed up, it is fair to conclude that the consuming public in the final analysis has fewer dollars and cents than it would have if there were no Chain Stores. Admittedly the Chain Store to-day is most concerned with the question of how high the price can be put on advertised leaders to still serve as a drawing card. The present-day largest fly in the Chain Store ointment is the fact that the regular merchant will not charge as much as he would like him to, and it is but natural that this should be so, because of the out-of-proportion expense which the Chain Store owner must bear before his output can begin to realize a profit. In truth, when the various details and factors are considered together, and as a whole, the buying advantage for the public from Chain Stores is imaginary and not based upon fact.

Coming now to consider, on the other hand, the direct disadvantages which accrue to the public, an analysis is startling and overwhelming. There are Chain Store Systems which include a thousand or more retail places of business in the same line, covering the entire or a large part of the country. There are communities in which a single Chain Store System operates fifteen to twenty percent of all the retail places of business in such line. There are communities in which Chain Stores in certain lines do fully half or more of the entire retail business in such line. There are a number of Chain Store systems operating with capital of from one to ten million, and even having or proposing up to fifty and one hundred million dollars, where the average investment in such lines for single stores is not as much as five thousand dollars. What does it mean and where will it lead?

Twenty-five Chain Drug Stores in a single community take the place of one hundred and twenty-five average Independent Drug Stores. Two hundred and fifty Chain Drug Stores take the place of twelve hundred and fifty average Independent Drug Stores. One thousand Chain Grocery Stores take the place of five thousand average Independent Groceries. These two will serve to illustrate in every retail line. Because of every Chain Drug Store about five retail pharmacists are prevented from going into business on their own account, and every store prevents from five to seven from becoming engaged as registered pharmacists. Every Chain Grocery Store prevents the operation of five regular Independent Groceries. Allowing that each such store must be in charge separately of a manager, who is satisfied with his opportunity and position in life as he would be if conducting his own place of business, there are, nevertheless, for each such store four individuals who may never hope to own and conduct their own business, and who otherwise would. How many thousands of Chain Stores in all the different retail lines now exist throughout the country it is not possible to determine, but only twenty thousand of such stores deny an independent conduct of their own business to one hundred thousand people. It is likely to be more nearly true that collectively there are one hundred thousand Chain Stores denying independent existence to a half million. This is only one of the condemning features. Every Chain Store in every line is dependent for its financial success upon the

largest use of unskilled and cheap help. Help that, outside of those holding the few responsible positions, never realizes a sufficient return to support a family and frequently not sufficient to support themselves. It surely is conservative to assert that every Chain Store takes the opportunity of five men who otherwise would hold positions and have sufficient earning to support a family. It is not too much to say that even to-day the Chain Store System throughout the country in various lines destroys or prevents the existence of half a million American homes, and what does it give the American people in return? The life of a community, the life of a nation, the happiness and prosperity of the people which it includes, depend upon their productive activity and the service which they render each other and for which they receive a living return to themselves and their families. Is it possible for any sane person to contend that the Chain Store with such advantages as it professes to offer does one-hundredth part as much good as it does harm? Even beyond this we must regard its influence on the political life of the individual and the nation.

Socialism and its spread is the dread of many. It is not my purpose to discuss it; I merely want to point out to those who dread it, and who fear the loss of initiative and individual effort, that the Chain Store Evil is rapidly undermining one of the few solid props upon which our present form of Government is built. The main bulwark against Socialism to-day are the farmer, the retail merchant and the professional man. To change the conditions which in the past have called for the retail merchant, or if we allow a change to take place which closes the door of hope to the vast number who have been accustomed to enter retail lines, we to that extent deliberately increase the supporters of Socialism. Our country has become great, and become what it is because it offered an equal opportunity for all. This condition has already been largely disturbed because of the growth of the so-called natural monopolies, and because of the vast aggregation of capital which is used for the exploitation of industry and manufacture, but justified to a large extent by the resulting economy if held under proper control and supervision. Nevertheless, this rapidly growing change in our industrial and manufacturing life has created a vast army of people who may never hope to conduct and own their own enterprises, who may never reach that point of independence in life for which it is human nature to strive. To this vast army of people, always realizing that they and their children will work for others and hold dependent positions, it matters but little for whom they work, and naturally they incline to a socialistic condition wherein everyone will be in their position. Allow capital and individual greed to, in the same manner, and altogether artificially, secure control of retail business, so that it will be conducted and owned by the few, compelling the many who otherwise would be independently engaged therein, on their own account, to work for others, to have no hope of securing sufficient capital that they may successfully compete with those who are using millions, and you add to the existing vast army another one of almost like proportion which naturally will incline to favor the socialistic state. The Chain Store, as I see it, is indeed an evil, which threatens the very foundations of our present form of Government. Only lately we have had in pharmacy a convincing illustration. Drug clerk strikes were undertaken or threatened in many of the large cities of the country. Does any one believe that such a movement would have

been thought of if the Chain Store did not exist? I believe that the evil which I have sought to point out is quite generally recognized or can be on even a casual study. If it admittedly exists, where can a remedy be found?

The power of capital unrestrained compels the suffering of many evil conditions. It is farsighted and many-sided. It is used to train the public mind to accept readily an apparent immediate small advantage and to disregard the far greater but not so immediate disadvantage. This is true in the exploitation of retail business along unnatural lines. The public may see the harm but stands ready to suffer it and even to support it, until the way is pointed out in which by collective action control is sought and secured. Legislation seems to hold the only effective remedy and fortunately in this connection legislation can be both precise and effective. We now have the Sherman Act, and the various State Anti-Trust Acts, which make "an intent to monopolize" a crime. Judicial decision to a small extent has pointed the way. It has been held, and correctly so, that the use of capital to secure control of a large portion or the larger portion of some single line of endeavor or business is "an intent to monopolize." Only because hundreds of millions are invested to carry out such intent and to recognize it, in industry and manufacture, has the use of smaller capital in retail lines, but with equally harmful effect, escaped notice. Because of the comparatively smaller amount of capital needed to attempt monopoly in retail business it may hope to further escape recognition of the "intent to monopolize" unless explicitly defined by Legislative enactment. I am of the opinion that the Chain Store System must be checked for the public good, and that it can be readily checked by defining an "intent to monopolize" to be the ownership and control of more than a certain number of business places by the same person, firm or corporation when engaged in the distribution and sale of goods and merchandise other than of their own manufacture and production. It is time for the retail business interests to bring this important question to public attention, it is time that our national and state legislators be called on to meet the situation.

ABSTRACT OF DISCUSSION.

C. O. Ewing considered the objections raised by Mr. Frecricks largely as hypothetical. The inception and continuance of Chain Stores in all lines are responsive to public demand for convenience and economy.

L. F. Kebler agreed with Mr. Ewing in part and viewed the harmfulness of Chain Stores in that they are owned and controlled by corporations who have no great interest in local affairs. Their main object is to get the money and, the stores being owned by corporations, the individuals have little civic pride nor do they contribute to developments in the city where the stores are located.

F. E. Stewart considered that growth of Chain Stores was not an argument for their worth to the community. Harmful promotions develop, but that does not signify that they are needful or of value to the public.

C. O. Ewing added to his argument by saying that Chain Store systems reduced the cost of distribution, and that the item of expense due to cost of distribution added largely to retail cost of goods.

Henry Kraemer stated that Chain Stores were doing away with prescription departments, that is, in some of the stores of the System. This would to that extent do away with registered pharmacists.

William Mansfield referred to manufacturing on a large scale by the Chain Stores, supplying pharmaceuticals and other products to the stores of the System. The products of manu-

facturers and to some extent of the U. S. P. and N. F. were displaced by their own. The manufacturing is done under supervision of experienced men but these are few in number compared to those who are qualified by education for their work.

Frederick J. Wulling emphasized the foregoing remarks by saying that the Chain Stores would probably aid in the separation of drug stores and pharmacies. He viewed the Chain Store System as a commercial enterprise; that the ideals seemed to be "to increase the income of the stores."

Mr. Freericks closed the argument by adding to the remarks of the foregoing speakers and references to parts of his paper. He contended that it was not for the best interests of pharmacy and the people to have a large number of untrained and uneducated men working under a few thus qualified. His proposal to provide legislation contemplates the limitation of the number of stores in any one chain of stores.

THE DETECTION OF INORGANIC PHOSPHATE IN GLYCEROPHOSPHATES.

J. L. Lizius in a paper before Liverpool meeting British Pharmaceutical Conference refers to the U. S. P. test for inorganic phosphate in the glycerophosphates, showing that the amount of substance to be tested should be .1 Gm. instead of 1 Gm.

He also refers to the test of Scott and Plimmer (*Jour. Physiology*, 1906, **35**, 120–1) for detecting minute quantities of inorganic phosphate mixed with organic phosphorus compounds. The reagent consists of,

Ammonium molybdate (10% solution)	80 Cc.
Hydrochloric acid, sp. gr. 1.16	12 Cc.
Ammonium chloride	20 Gm.
Potassium persulphate, saturated solution	10 Cc.

Pour the ammonium molybdate into the acid with continual stirring, add the ammonium chloride, and when this has dissolved, add the persulphate. Allow to stand to allow any phosphate present in the reagents to be precipitated. Filter.

Excess of the reagent must be used—5 Cc. to 0.1 Gm. of the substance to be tested. If inorganic phosphate be present a precipitate will be formed in a few minutes; if organic phosphates be present a precipitate is formed on boiling. The author states that this reagent will denote the presence of 0.001 percent of inorganic phosphate in glycerophosphate.

THE DETERMINATION OF FREE ACETIC ACID IN ACETYL-SALICYLIC ACID.

A. Nutter Smith, in a paper before the recent meeting of the British Pharmaceutical Conference (*Ph. and Jour. Pharmacist*, July 24, p. 90), describes a new and accurate method of estimating free acetic acid in acetyl-salicylic acid. It has been found that in the majority of instances free salicylic and acetic acids balance substantially; when acetic acid is in excess it is probably due to retention of acid due to incomplete purification, and when deficient it intimates that acetic acid has volatilized. The B. P. coloration test for free salicylic acid is not very sensitive, and can easily be masked in a manner not so easily detected. Salts of acetyl-salicylic acid appear to hydrolyze into free salicyclic acid and an acetate of the base, and it is certain that they possess no advantage whatever over the acid as found on the market to-day, containing free salicylic acid in amount sufficient to produce the gastric disturbance usually attributed to the salicylates, an objection which caused the latter to be superseded by the acetyl ester. Standards of 0.1 percent free salicyclic and 0.05 percent free acetic acid are suggested for the drug, and double these amounts for tablets. If these limits are exceeded the controlling analyst would be justified in "failing" the sample, especially if recently prepared. It is well known that aspirin tablets on keeping tend to show an increase in the amounts of free acids present.

TANNED SPONGES.

According to the *Scientific American* an interesting process has recently been developed for increasing the efficiency and extending the life of sponges used for technical purposes, automobile washing, office use, etc.—in fact for all purposes except use on the human anatomy. It consists in a modified tanning process, and it makes the sponge take the water much better and act more satisfactorily in giving it up to the work.

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Conducted by H. V. Arny, Reporter on the Progress of Pharmacy, Chairman of the Committee on Research.

On these pages, each month, will be found a list of articles on pharmaceutical research that appear in the pharmaceutical and other scientific journals of the world. Whenever possible, the list appearing a certain month will record articles appearing in American journals of the preceding month and articles appearing in foreign journals will be recorded as quickly as possible after the journals reach the Reporter.

All articles appearing in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which will be issued as soon after the end of the year represented as editing and printing conditions permit. Those desiring abstracts immediately can obtain same for a fee of one dollar each by communicating with H. V. Arny, 115 West 68th St., New York, and arrangements can also be made for securing photographic reproduction of entire articles at moderate prices when such are desired.

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Z. Oest. Apoth. Ver.; through *Pharm. Ztg.*, 65 (June 26, 1920), 470

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D. A. Apoth. Ztg., 41 (Aug. 1920), 72

Youngken, H. W., and Slotter, C. F.
Commercial varieties of nux vomica
Am. J. Pharm., 92 (Aug. 1920), 538

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Chem. & Drug., 93 (Aug. 7, 1920), 1112

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Pharm. Weekbl., 57 (July 31, 1920), 889

Corrigan, J. F.
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Chem. News, 121 (Aug. 20, 1920), 88 and 102

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D. A. Apoth. Ztg., 41 (Aug. 1920), 75

Hahn, A.
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Dtsch. Med. Wschr.; through *Pharm. Ztg.*, 65 (June 16, 1920), 444

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Science, 52 (Sept. 3, 1920), 227

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J. pharm. chim., 22 (July 16, 1920), 52

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Nat. Drug., 50 (Sept. 1920), 437

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J. Phys. Chem.; through *Chem. News*, 121 (Aug. 13, 1920), 80

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Solubility of volatile oils in mixtures of alcohol and water
J. Am. Pharm. Assoc., 9 (Sept. 1920), 878

Zerner, E.
Chemistry of alcoholic fermentation
Ber.; through *Pharm. Zent.*, 61 (July 15, 1920), 395

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Blanchetiere, A.
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Bull. soc. chim.; through *J. Soc. Chem. Ind.*, (Aug. 16, 1920), 543A

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Influence of ammonium salts on the precipitation of magnesium hydroxide
Helv. chim. Acta.; through *Pharm. Zent.*, 61 (July 15, 1920), 397

Desgrez and Labat
Simple test for carbon monoxide
Compt. rend acad. mid.; through *Pharm. Weekblad*, (July 31, 1920), 891

Ellis
Therapeutic oxygen
Lancet; through *Pract. Drug.*, 38 (Sept. 1920), 36

Finck, J.
Iodine in angina
Münch. Med. Wsch.; through *Pharm. Ztg.*, 65 (July 10, 1920), 511

Giaya, S.
Zinc in the human organism
J. pharm. chim., 22 (Aug. 1, 1920), 85

Job, P., and Urbain, G.
Detection of sulphanions in mixtures
Compt. rend.; through *J. pharm. chim.*, 22 (Aug. 1, 1920), 127

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Volumetric dichromate assay of barium and strontium
Pharm. Weekblad, 57 (Aug. 21, 1920), 972

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Assay of mercuric chloride
Pharm. Weekblad, 57 (Aug. 7, 1920), 913

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Pharm. Weekblad, 57 (Aug. 14, 1920), 934

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Sensitiveness of potassium tests
Z. anal. Chem.; through *J. Soc. Chem. Ind.*, 39 (Aug. 31, 1920), 584A

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Reaction of tin salts
Ann. chim. anal.; through *Drug. Circ.*, 64 (Sept. 1920), 332

Massink, A.
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Water; through *Pharm. Weekblad*, 57 (July 31, 1920), 892

Metzl, A.
Gravimetric assay of cobalt and nickel
Z. anal. Chem.; through *Pharm. Zent.*, 61 (July 1, 1920), 371

Nicolardot, R., Regalde, A., and Geloso, M.
Volumetric assay of manganese
Compt. rend.; through *J. pharm. chim.*, 22 (Aug. 1, 1920), 126

Tour, R. S.
Manufacture of synthetic ammonia in America
J. Ind. Eng. Chem., 12 (Sept. 1920), 844

Von Bertalan
Hydrogen dioxide assay
Chem. Ztg.; through *Drug. Circ.*, 64 (Sept. 1920), 340

ORGANIC CHEMICALS.

Anon
Isotonic solutions of hexamethylenamine
Prensa. med. Argentine; through *Pharm. J.*, 105 (Aug. 14, 1920), 188

Anon
Oil of *Melaleuca leucodendron*
Roure, Bertrand's Bull.; through *Pharm. Era*, 53 (Sept. 1920), 273

Anon
Preservation of volatile oils
Pract. Drug., 38 (Sept. 1920), 36

Anon
Relative sweetening value of sugar substitutes
Am. Drug., 68 (Sept. 1920), 25

Abelin, H.
Action of di-iodotyramin in the metamorphosis of tadpoles
Biochem. Zsch.; through *Pharm. Zent.*, 61 (July 8, 1920), 386

Arny, H. V., and Schafer, H. H.
Distinguishing the hydrobromide and hydrochloride of quinine
D. A. Apoth. Ztg., 41 (Aug. 1920), 77

Auerbach, M.
Melting point of acetylsalicylic acid
Pharm. Ztg., 65 (July 10, 1920), 509

Bourquelot, E.
Glucosan
Compt. rend.; through *Chem. News*, 121 (Aug. 1920), 107

Bourquelot, E., and Bridel, M.
New biochemic test for glucose
Compt. rend.; through *J. pharm. chim.*, 22 (July 16, 1920), 73

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Preparation of sucrose from gentianose
Compt. rend.; through *J. Soc. Chem. Ind.*, 39 (Aug. 16, 1920), 554A

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Differentiation of oxalic and lactic acid from tartaric acid
Chem. Ztg.; through *J. Soc. Chem. Ind.*, 39 (Aug. 16, 1920), 557A

Brezina
Nicotine assay
Mitt. Oest. Tabak. Inst.; through *Drug. Circ.*, 64 (Sept. 1920), 340

Caron, H., and Raquet, D.
Oxalic acid color reaction
Bull. Sci. Pharm.; through *Pharm. Era*, 53 (Sept. 1920), 274

Chernoff, L. H.
Color test for oxalic acid
J. Am. Chem. Soc., 42 (Sept. 1920), 1784

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Chem. & Drug., 93 (Aug. 28, 1920), 1223

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Detection of acetates in mixtures
Chem. News; through *Pharm. Era*, 53 (Sept. 1920), 274

Dixon, H. H., and Mason, T. G.
Cryoscopic assay of cane sugar
Proc. Dublin Sci. Soc.; through *Pharm. Weekblad*, 57 (Aug. 14, 1920), 941

Fernbach, A., and Schoen, M.
Biochemic production of pyruvic acid
Compt. rend.; through *J. pharm. chim.*, 22 Aug. 1, 1920), 126

Franck, H.
Products of oxidation of paraffin
Chem. Ztg.; through *J. pharm. chim.*, 22 (Aug. 1, 1920), 111

Gaffery
Quinine hydrobromide
J. Am. Med. Assoc.; through *Pharm. J.*, 105 Aug. 21, 1920), 220

Grove, O.
Influence of concentration of sugar solutions on growth of microörganisms
Pharm. Weekblad, 57 (July 31, 1920), 893

Guerbet, M.
Toxicological detection of atropine, cocaine and stovaine
Compt. rend.; through *J. Soc. Chem. Ind.*, 39 (Aug. 16, 1920), 559A

Hartmann and Zila
Fate of quinine in the organism
Arch. Exp. Path. Pharm.; through *Pract. Drug.*, 38 (Sept. 1920), 36

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Vanillin reactions
Z. anal. Chem.; through *Pharm. Zent.*, 61 (June 10, 1920), 329

Heiduschka, A., and Wolf, L.
Quantitative test for methyl alcohol in ethyl alcohol
Pharm. Zent., 61 (July 1, 1920), 361

Helferich, B., and von Kühlewein, M.
Synthesis of purin glucosides
Ber.; through *Pharm. Zent.*, 61 (July 8, 1920), 385

Hess, K., and Weltzein, W.
Decomposition of isoconiine
Ber.; through *Pharm. Zent.*, 61 (July 1, 1920), 371

Hildt, E.
Wij's iodine number
Chem. Umschau.; through *Pharm. Zent.*, 61 (June 17, 1920), 345

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Assay of sodium salicylate
J. Am. Pharm. Assoc., 9 (Sept. 1920), 878

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Uses of tetralin
Seifenfab.; through *Pharm. Ztg.*, 65 (June 16, 1920), 444

Kauffman, M.
Alpha-naphthol test for traces of sugar
Niederl. Indie.; through *J. Soc. Chem. Ind.*, 39 (Aug. 31, 1920), 580A

Kelver, C.
Oxidation of paraffin with free oxygen
Ber.; through *Pharm. Zent.*, 61 (July 15, 1920), 396

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Physical constants of pure aniline
J. Ind. Eng. Chem., 12 (Sept. 1920), 881

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Antipyrine-benzoic acid compound
Monatsh. Chem.; through *J. Soc. Chem. Ind.*, 39 (Aug. 16, 1920), 557A

Kremers, E.
Heptane and its solution
J. Am. Pharm. Assoc., 9 (Sept. 1920), 857

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Physical constants of heptane
J. Am. Pharm. Assoc., 9 (Sept. 1920), 860

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Thiophene in furunculosis
Münch. Med. Wsch.; through *Pharm. Ztg.*, 65 (July 10, 1920), 511

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Apoth. Ztg.; through *Pharm. Ztg.*, 65 (June 16, 1920), 444

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Crystallized guanylic acid
J. Biol. Chem.; through *J. pharm. chim.*, 22 (Aug. 1, 1920), 118

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Nitroform assay
Chem. Soc. Trans.; through *J. Soc. Chem. Ind.*, 39 (Aug. 16, 1920), 557A

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Synthesis of camphor
Pharm. Era, 53 (Sept. 1920), 269

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Ferric chloride test for diacetic acid
Med. J. Australia; through *Am. J. Pharm.*, 92 (Aug. 1920), 598

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Veronal poisoning
Med. Klin.; through *Pharm. Ztg.*, 65 (July 7, 1920), 503

Muir, E.
Hydrocarpate and morrhuate of sodium in leprosy
Ind. Med. Gaz.; through *Pharm. J.*, 105 (Aug. 21, 1920), 220

Ost, H.
Chloroform soluble cellulose acetate
Z. angew. chem.; through *Pharm. Zent.*, 61 (June 24, 1920), 353

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Resistance of aconitine to putrefaction
Am. Soc. Quim. Argentina; through *Pharm. J.*, 105 (Aug. 21, 1920), 222

Perutz, A.
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Wien. Klin.; through *Pharm. Zent.*, 61 (June 17, 1920), 346

Phillips, M., and Gibbs, H. D.
Resorcinol by alkali fusion
J. Ind. Eng. Chem., 12 (Sept. 1920), 857

Plaisance, G. P., and Monsch, H.
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J. Home Econ.; through *Am. J. Pharm.*, 92 (Aug. 1920), 603

Pozerski, E.
Liquefaction powers of papain
J. pharm. chim., 22 (July 16, 1920), 74

Reisz, F.
Melting point of wax
Pharm. Ztg.; through *Pharm. Zent.*, 61 (June 10, 1920), 331

Richardson, C. B.
Phenol in influenza
Practitioner; through *Pharm. J.*, 105 (Aug. 21, 1920), 220

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History of morphine
Schweiz. Apoth. Ztg., 58 (Aug. 5, 1920), 409

Sandquist, H., and Mohlin
Ammonium tetroxalate from amyl nitrite
Ber.; through *Pharm. Zent.*, 61 (July 1, 1920), 371

Schanz, F.
Death from caffeine injections
Pharm. Ztg., 65 (July 14, 1920), 521

Scheibler, H.
Sulphoichthyolate bodies
Arch. Pharm.; through *Pharm. Ztg.*, 65 (June 16, 1920), 443

Semmler and Jones
Oil of galbanum
Roure, Bertrand's Bull.; through *Pharm. Era*, 53 (Sept. 1920), 273

Sivolsbof, A.
Oil of *Datura stramonium*
Roure, Bertrand's Bull.; through *Pharm. Era*, 53 (Sept. 1920), 273

Spinner, J. R.
Poisoning by eucalyptus oil
Dtsch. Med. Wsch.; through *Pharm. Ztg.*, 65 (July 10, 1920), 510

Stockert, K.
Stability of milk fat
Chem. Umschau.; through *Pharm. Zent.*, 61 (July 1, 1920), 372

Sundberg, T., and Lundborg, M.
Iodine number of fats
Z. Unters. Nahr. Genussm.; through *Pharm. Ztg.*, 65 (June 16, 1920), 443

VanLeersum, P.
History of quinine production in Java
Chem. & Drug., 93 (Aug. 28, 1920), 1213

Wester, D. H.
Urease content of Dutch seeds and of soy beans
Pharm. Zent., 61 (July 8, 1920), 377

Wischo
Starch from horse chestnuts
Z. Oest. Apoth. Ver.; through *Pharm. Zent.*, 61 (July 15, 1920), 395

Wohl, A., and Braeunig, A.
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Chem. Ztg.; through *J. pharm. chim.*, 22 (Aug. 1, 1920), 113

Yamazaki, E.
Chemical kinetics of urease
Sci. Rep. Tohoku Univ.; through *J. Soc. Chem. Ind.*, 39 (Aug. 16, 1920), 555A

CLINICAL AND DIAGNOSTIC METHODS.

Fabre, R.
Assay of mercury in urine
J. pharm. chim., 22 (Aug. 1, 1920), 81

Jolles, A.
Detecting indican in urine and blood
Med. Klin.; through *Am. J. Pharm.*, 92 (Aug. 1920), 603

Klein, F.
Hyperoxidation test for cancer
Pract. Drug., 38 (Sept. 1920), 24.

Rodillon
Value of chloride assay of blood
Presse. med.; through *Drug. Circ.*, 64 (Sept. 1920), 339

Weiss, M.
Analysis of coloring matter in urine
Biochem. Zsch.; through *Pharm. Ztg.*, 65 (June 19, 1920), 450

Weiss, M.
Permanganate in urine analysis
Dtsch. Med. Wsch.; through *Pharm. Ztg.*, 65 (June 19, 1920), 450

MISCELLANEOUS.

Denis & Minot
Feeding calcium salts
J. Biol. Chem.; through *Drug. Circ.*, 64 (Sept. 1920), 339

Hinhede
Role of vitamines in nutrition
Chem. Umschau.; through *Pharm. Zent.*, 61 (July 1, 1920), 372

Lavalle, y., Garcia, J. A.
Hydrogen sulphide in South American sea water
Boll. Soc. Geog., Lima.; through *Pharm. J.*, 105 (Aug. 21, 1920), 220

White, F. A.
Centenary of the Paris Hospital House
Am. Drug., 68 (Sept. 1920), 28

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter. To maintain its activity and representation each Branch should see that at least three of its meetings, during the year, are reported in the JOURNAL.

NORTHERN OHIO BRANCH.

A meeting of the Northern Ohio Branch of the American Pharmaceutical Association was held Friday, July 9, at Western Reserve University School of Pharmacy. President O. E. Muhlhan presided.

Reports were heard from delegates and others who attended the meeting of the American Pharmaceutical Association and the Centenary meeting for the revision of the United States Pharmacopoeia. Professor Spease gave a general report of the meetings, and called attention to the excellent papers that were read in the various Sections. He expressed the hope that more druggists from Ohio would attend the annual convention.

R. W. Terry read a paper on Aromatic Cascara and Milk of Magnesia. W. M. Fox reported on an interview he had with Prohibition Commissioner John F. Kramer while in Washington.

W. F. HAGEMEISTER,
Secretary.

COUNCIL BUSINESS

A. PH. A. COUNCIL LETTER NO. 5.
(Abstract.)

WASHINGTON, D. C., August 18, 1920.

13. *Election of members—result of vote.* Motion No. 11 (Applications Nos. 43–83, inclusive, for active membership) and motion No. 12 (Applications Nos. 12–15, inclusive, for soldier and sailor membership) have each received a majority of affirmative votes.

14. *Relates to correction in name and address of member of Council.* The name and address of Mr. Porterfield as given in Council Letter No. 1, Item 2, should be changed to W. P. Porterfield, Fargo, North Dakota.

15. *Nominations made to fill vacancies on the Publication Committee (Items 4, 8, 10).*

16. *Budget for the Year Book.* Secretary Day writes from Chicago under date of August 11, 1920: "The budget item for the Year Book is only $4,000. The expense for the current Year Book for printing, binding and mailing is $5,006.28. In addition, some other expenses have been incurred by Reporter Army and there will be still some expense for postage for mailing extra copies."

The Finance Committee approves of an additional appropriation of $1100.00 to cover this deficit.

A motion to appropriate this additional sum for the budget of the Year Book is made by W. B. Day and seconded by J. A. Koch. A vote card is enclosed.

A. G. DUMEZ, *Secretary.*

A. PH. A. COUNCIL LETTER NO. 6.
(Abstract.)

WASHINGTON, D. C., September 21, 1920.

17. *Additional appropriation for budget of the Year Book—Result of vote.* Motion No. 16, a motion to appropriate an additional $1100 for the budget of the Year Book has received a majority of affirmative votes.

18. *Election of members to fill vacancies on the Publication Committee (Items 4, 8, 10, 15).*

The following were elected to fill the vacancies on the Publication Committee: J. H. Beal, A. G. DuMez, Chas. H. LaWall.

19. *Nominations for Chairman of the Publication Committee.* According to the by-laws the Council is required to elect the Chairman of the Publication Committee.

20. *Election of active members.* You are requested to vote on the following applications for active membership:

No. 84, J. Frank Gallaher, 125 S. Main St., Dayton, Ohio; No. 85, Charles Pitt, 944 Fairview St., Camden, N. J.; No. 86, Percy K. Heiston, Allerton, Iowa; No. 87, Wilford Ronald Hart, 413 4th St., Rockwell City, Kans.; No. 88, Arthur Carl Freese, Box 232, Woonsocket, S. Dak.; No. 89, Norburg Thornton Hendrix, 1044 Camaucke Ave., Clinton, Iowa; No. 90, Harry Wallace Foster, Gladbrook, Iowa; No. 91, Lewis Bennett Caslavka, Traer, Iowa; No. 92, Anna Hofstadter, Osceola, Iowa; No. 93, James E. Larson, West Branch, Iowa; No. 94, W. Frank Cosh, Underwood, Iowa; No. 95, Raymond Earl Scott, Hedrick, Iowa; No. 96, Louis C. Hodoval, Oxford Junction, Iowa; No. 97, Charles Robert Steward, 116 Bank St., Wallace, Idaho; No. 98, Rudolph Alexander Konnerth, 175 East 91st St., New York, N. Y.; No. 99, William August Moershel, Homestead, Iowa; No. 100, Mrs. Mary E. Apple, 268 Lake Drive, St. Petersburg, Fla.; No. 101, Frank Gerstmann, Morgan, Minn.; No. 102, James W. Trauseau, Ransom, Ill.; No. 103, Preston B. Myers, 1609 Farnam St., Omaha, Nebr.; No. 104, Paul Victor, LaCrosse, Wash.; No. 105, Stephen A. Holt, Broadus, Mont.; No. 106, Clyde Peon Dixon, Pleasantville, Iowa; No. 107, Clee Lane Morrison, 629 Orr St., Miles City, Mont.; No. 108, Carl Amanuel Moser, care of Gardston Drug Store, Esterville, Iowa; No. 190, William John Witt, Elkader, Iowa; No. 110, Bert Vande Brake, Rock Valley, Iowa; No. 111, Louis H. Lutjens, 9th St., Sheldon, Iowa; No. 112, Herbert M. Moore, Washington and 9th Sts., Montpelier, Idaho; No. 113, Eddie M. Wertz, 301 Brady St., Davenport, Iowa; No. 114, Ralph A. Jones, Stanhope, Iowa; No. 115, Ko Suto, 1421 Arch St., Philadelphia, Pa.; No. 116, Harry A. Stedman, 1101 W. 9th St., DesMoines, Iowa; No. 117, Frank P. Homan, Wing, N. Dak.; No. 118, Louis Mortimore White, 640 E. 7th St., Oklahoma City, Okla.; No. 119, Elmer Henry Rickman, Battle Creek Drug Co., Battle Creek, Iowa; No. 120, Claude Howard Sampson, 731 Boylston St., Boston, Mass.; No. 121, Myron D. Denniston, 220 West Second St., Davenport, Iowa; No. 122, Robert Roy Miskimon, 91 Barclay St., New York, N. Y.; No. 123, Marie Verena Meyer, R. F. D. No. 1, Sac City, Iowa; No. 124, Harry Julius Hammer, 2413 3d Ave., New York, N. Y.; No. 125, Isidor Louis Romanoff, 2413 3d Ave., New York, N. Y.; No. 126, T. D. Wilkinson, Jr., Church St., Madison, Ala.; No. 127, Carter H. Latham, 318 E. Clinton St., Huntsville, Ala.; No. 128, John W. Patton, 211 N. 19th St., Birmingham, Ala.; No. 129, Elbert W. Gibbs, 801 Ridgely Apts., Birmingham, Ala.; No. 130, V. E. Krauss, 1328 N. 30th St., Birmingham, Ala.; No. 131, L. G. Morris, 1104 Sylvan Ave., Birmingham, Ala.; No. 132, Tim V. Chumley, 1346 N. Sua St., Birmingham, Ala.; No. 133, E. A. Herlong, Fairfield, Ala.; No. 134, Winston J. Pittman, 2120 6th Ave., N., Birmingham, Ala.; No. 135, R. W. Fleming, 2223 20th Ave., Ensley, Ala.; No. 136, David Letaw, 320 N. 20th St., Birmingham, Ala.; No. 137, Verttle T. Kissell, 1100 N. 13th St., Birmingham, Ala.; No. 138, Randolph P. Mullins, 217 Broad St., Selma, Ala.; No. 139, H. B. Foster, Haleyville, Ala.; No. 140, Robert Houston Scruggs, York, Ala.; No. 141, Walter Jacob Kephart, 220 Sharon Ave., Sharon Hill, Pa.; No. 142, Glen O. Taylor, Newmarket, Iowa; No. 143, Wayne W. Weitgenant, 100 N. 1st St., Raton, New Mexico; No. 144, John L. Bartlett, 520 W. Elmira St., San Antonia, Texas; No. 145, S. M. Harshfeld, 600 S. Montana St., Butte, Mont.; No. 146, Franklin C. Mueller, Deer Lodge, Mont.; No. 147, Victor M. Stein, 2855 W. 38th St., Chicago, Ill.; No. 148, V. W. McCall, 312 Main St., Danville, Va.; No. 149, J. F. Dailey, Roxboro, N. C.; No. 150, Bernard Alfred Ashcraft, Clearfield Hospital, Clearfield, Pa., S. & S. member; No. 151, Mrs. Anita Shepard, 537 E. State St., Corydon, Iowa; No. 152, George W. McDuff, 2712 Magazine St., New Orleans, La.

21. *Appropriation for War Veterans Committee.* Secretary Day advises that the Council failed to make an appropriation for the work of the War Veterans Committee, and makes a motion to appropriate $25.00. The motion has the approval of the Finance Committee, and is seconded by Chairman J. A. Koch.

A. G. DuMez, *Secretary.*

COMMITTEE REPORTS

REPORT OF COMMITTEE ON PATENTS AND TRADE MARKS, A. PH. A., 1920.*

Since the last meeting of our Association there has been no change in the fundamental patent and trade mark laws of this country. We pointed out in our last report that two bills were before Congress which would effect a reorganization of the patent office and patent litigation.

One of these was entitled "A Bill to Establish a Patent and Trade Mark Office Independent of Any Other Department and to Provide for Compensation and Infringement of Patents in the Form of General Damages and for Other Purposes." The other was entitled, "A Bill to Establish a United States Court of Patent Appeal and for Other Purposes." Neither of these bills has passed since our last meeting, but they have received the endorsement of many scientific and trade organizations.

We recommended at our last meeting that these bills be endorsed and this was done. We now recommend a reëndorsement of these bills by the American Pharmaceutical Association.

The subjects relating to patent and trade marks now exciting the most interest in medical, pharmaceutical and drug circles are as follows:

1. The Chemical Foundation, Incorporated, which, as you know, was organized to lease out the German dye patents seized by the Alien Property Custodian during the great World War. It is capitalized at $500,000. It was not organized to make money, and according to the General Council of the Corporation, Mr. Joseph H. Choate, none of the incorporators will be able to make money out of it. The President of this Corporation is Mr. Francis B. Garvan, Assistant Attorney General of the United States.

The control over the German dye patents, exercised by the Chemical Foundation, Incorporated, gives this Corporation immense power and influence, and there is much speculation in regard to the probable action of the Government in relation thereto. To insure impartiality in the issue of licenses, the trustees of the Corporation are not dye makers, but are composed of men wholely dissociated either from the dye makers or dye industries.

2. Much interest also attaches to the plan of the Government which may be described as "compulsory license" in relation to patented chemical products. The question is, what will be the final result of this system? Will it overcome some of the serious objections pertaining to our system of "product patents" by which the first inventor of a process for producing a chemical compound hitherto unproduced, by patenting both product and process, has been able to prevent all future inventors from marketing the same product until the expiration of the original patent; a system which defeats the very object of the patent law?

3. The demand on the part of certain commercial interests for legislation on the subject of trade marks to secure their registration; this registration to include the names of various chemical and medicinal products, and the names of journals, magazines, etc., as suitable subjects for registration and commercial control. By including the names of products in a group of things suitable for registration, it is hoped that legislation may be secured of such character as to practically endorse the claim that the names of chemical substances and medicines are proper subjects for commercial control, by the manufacturers, of the articles for which these names are used as appellatives. It will be remembered that the word "Aspirin" was removed from the trade mark register because the manufacturer of the product known under that name had succeeded by his advertising, in forcing the name Aspirin into the common language as a noun, so that the public in purchasing the product accepted this name as an appellative in the same manner as people accept the name "Chloroform" as the proper name for Trichlormethane; Saccharine for Benzosulphinidum; Antipyrine for Phenazone; Phenacetin for Acetphenetidinum, etc.

If is freely admitted by prominent patent lawyers that the intent is to secure control over the nomenclature of advertised chemical, medicinal and food products of such character as to create a lasting monopoly of the sale of such products under the registered names. It is admitted that the desire is to place these substances in a position that would have been acquired by the first manufacturer of quinine, if said manufacturer had patented quinine as a product, also

* Presented and accepted at the City of Washington meeting, A. Ph. A., 1920.

patented the first process for producing quinine, and had registered the name quinine as a trade mark. If this had been done, and legislation secured of the kind now aimed for, the first discoverer of the alkaloid quinine would have been able to monopolize its sale under the control of the patents for 17 years, and then, having established the name quinine as an appellative by advertising the same as a noun of the language, would also have been able to control the sale of quinine under that name during the lifetime of the inventor and his heirs and assigns.

When it is recalled that the names of practically all the newer chemical substances, including the so-called registered names, have been incorporated in the dictionaries and textbooks as synonymous with the chemical names, and many of these registered trade names have also been included as synonyms in the Pharmacopoeia, the danger to chemical and materia medica nomenclature, and to the publishing houses, and also to the science of chemistry and materia medica, and to the educational institutions teaching this science, becomes at once apparent.

4. Much interest is also being excited on the part of those who are behind the scenes in the attempt to secure an international agreement on this subject of trade marks of such character as to make it a crime for the citizens of any nation entering into the agreement to use any of the registered names in labeling their products. In other words, to use the quinine illustration above referred to, such an agreement would have made it a crime for any person, except the original manufacturer, to produce and sell quinine under the name quinine in any part of the world subject to the aforesaid agreement.

Further information in relation to this scheme for the revision of the laws relating to trade marks may be obtained by referring to the "Report of the Commissioners Appointed to Revise the Statutes Relating to Patents, Trade and Other Marks, and Trade and Commercial Names, under Act of Congress, Approved June 4, 1898, Senate No. 20."

5. The subject of Formula Disclosure Bills is also attracting much attention, because it is realized by the so-called proprietors of secret formula preparations that such legislation may result in jeopardizing their so-called trade mark rights. The following paragraph appears in the Editorial Department of "Standard Remedies" for December 1915. As stated on the title page, "Standard Remedies is published in the interest of the Manufacturers and Jobbers of Proprietary Medicines, Cosmetics, etc." We quote from pages three and four:

> "The name of a secret or proprietary preparation is descriptive thereof, and hence is not a valid trade mark. Any one who discovers the secret and makes the goods according to the formula may use the name to describe the goods." (Cyc., 38–740.)
>
> "The name of a secret and proprietary preparation will be protected against unauthorized use or imitation as the name of some other different preparation of like kind sold in competition, but not made in accordance with the formula of the original and genuine article, even though the labels and wrappers are entirely different because such a use is necessarily false and deceptive.
>
> "But such names are generally descriptive and therefore may be used by anyone who discovers and knows the secret of the composition of the article and makes his own article according to the original formula. If such is the truth a subsequent user of the same must add some distinguishing statement showing that the article is his own production of the article known by that name and he must not imitate the dress or the make-up of the goods in addition to using the name, or do any affirmative act calculated to deceive the public and pass off the goods as and for the previously known goods." (Cyc. 38–835.)

The "Standard Remedies" also states that, "The principle herein set down is that the courts will not protect the manufacturer of a proprietary article against the use of the name of that article by another who 'discovers and knows' the secret of the composition, but will protect the original owner of the name against such unfair competition as might result from simulation of the package, or against any affirmative act calculated to 'pass off the goods as and for the previously known goods.' "

"In other words, Mr. Smith has a preparation known by a trade name and manufactured under a secret formula or process. Jones, his competitor, 'discovers and knows' the secret of composition and can make the identical article made by Smith and call it by a trade name originated by Smith, and the courts will not protect Smith, but the courts will protect Smith against

unfair competition resulting from an 'affirmative act' calculated to 'pass off the goods as and for the previously known goods.' Jones may not dress his goods in imitation of Smith's and must even add some distinguishing statement showing that the article is of his own production, and is not the production of Smith, but the main point is that Jones may, if he can duplicate the product exactly, call it by the trade name devised by Smith by which name the trade is accustomed to call for it and to know it."

6. Your Committee has been requested to consider the question of trade marks in relation to medicinal preparations of secret formula. The questions relating to this subject have already been considered by the Committee in former reports and some of the questions are answered in the above statement copied from "Standard Remedies." Your Committee has on file a large number of decisions of reports on this subject, to which those interested may have the opportunity of referring, by addressing the Chairman.

In closing, your Committee begs to again call attention to the following statements which appeared in the report of the Committee on Patents and Trademarks in 1917:

> "The right to the exclusive use of an invention is not a natural right—that is, pertaining to a man in a state of nature; but, when it exists at all, is a civil right, pertaining to man under the protection of a civil government."[1]
>
> "An inventor has no right to his invention at common law. He has no right of property in it originally. The right which he derives is a creature of the statute and of grant, and is subject to certain conditions incorporated in the statutes in the grants."[2]
>
> "As pointed out in this report, trademarks differ from patents. By registering a name, the person who registers it does not receive a grant from the Patent Office, conferring upon him the exclusive right to the use of the name. Irrespective of registration, a manufacturer may adopt a word as his trademark and as long as he uses it as a commercial signature to distinguish his brand of the article from other brands of the same article, said article being open to competition under its specific designation, he will be protected in such use of the word. As already shown, it is not necessary that the word should be a coined word. Any word may be so used provided it is used as a trademark and not used as the name of the article itself."
>
> "It is evident, therefore, that 'the policy that the mere use of a name to designate an article would give to those employing it the exclusive right to designate such article by such name, would be giving a copyright of the most odious kind, without reference to the utility of the application or the length of the title, and one that would be perpetual. Neither the Trademark Law, nor the Copyright Law, nor the Patent Law, affords any such right, or, under the pretense of the same, allows any one to throttle trade under the alleged sanction of law.' (Browne on Trademarks.)"

Committee { C. L. ALSBERG, R. P. FISCHELIS, W. A. PUCKNER, S. C. HENRY, F. E. STEWART, *Chairman*.

SOLUBLE LEAD IN THE GLAZE OF CASSEROLES.

In a recent issue of the *Experiment Station Record*, there is abstracted a report on certain experiments made by H. Masters, with several types of earthenware casseroles, of French make, glazed only on the inside; and which showed that, in some cases, a considerable amount of lead can be extracted from the glaze not only by the action of 4 percent acetic acid but (and this is important) also by the action of dilute solutions of organic acid; namely, 1 percent acetic, citric or malic acid. It is further stated that glazed earthenware casseroles should, before being used, be treated with dilute acetic acid, which is kept at boiling temperature for an hour or more in the dish.

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[1] Simonds Manual of Patent Law.

[2] 1. Am. H. & L. S. & D. Mach. Co. vs. Amer. Tool and Mach. Co., 4 Fisher's Pat. cases, 294.

EDITORIAL NOTES

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Collaborators: C. HERBERT PACKARD, President, A. Ph. A.; WILBER J. TEETERS, President, A. C. P. F., H. C. CHRISTENSEN, Secretary, N. A. B. P., E. FULLERTON COOK, Chairman, U. S. P. Revision Committee; CHARLES H. LAWALL, Chairman, Council A. Ph. A. The Chairmen of the Sections A. Ph. A.: A. G. DUMEZ, IVOR GRIFFITH, EDWARD SPEASE, CHARLES O. LEE, CURT P. WIMMER and E. F. KELLY.

ALKALINIZED SOLUTIONS OF ARSPHENAMINE RENDERED HIGHLY TOXIC IN PRESENCE OF AIR.

The United States Public Health Service has published a paper by George B. Roth, pharmacologist at the hygienic laboratory of the service, on the effect of shaking certain solutions of arsphenamine and neoarsphenamine in the presence of air. The results of these studies are summarized as follows:

"Shaking alkalinized aqueous solutions of arsphenamine or aqueous solutions of neoarsphenamine in the presence of air renders them highly toxic, as shown by intravenous administration to white rats. The increase in toxicity caused by such shaking is presumably due to the oxidation of these compounds to *p*-oxyphenylarsenoxide, commonly called 'arsenoxide,' inasmuch as shaking a solution of neoarsphenamine in the absence of air does not increase the toxicity of such a solution. The toxicity of alkalinized aqueous solutions of arsphenamine or aqueous solutions of neoarsphenamine is greatly influenced by the manner in which they are prepared for administration."

THE CENTENARY OF OERSTED'S DISCOVERY.*

On August 31 and September 1 the centenary of the discovery of electromagnetic action by the Danish physicist, Hans Christian Oersted, was celebrated at Copenhagen. Meetings were held in the Town Hall and University, at which many Scandinavian men of science were present, and the occasion was marked by the publication of some of Oersted's scientific correspondence. It was during the winter of 1819–20 that Oersted observed that a wire uniting the ends of a voltaic battery affected a magnet placed in its vicinity, and after prosecuting his inquiries some months longer, in July 1820 he published his Latin tract, "Experimenta circa effectum Conflictus Electrici in Acum Magneticum." The importance of his discovery received instant recognition. Ampere, Arago and Davy all seized on the idea, and four months after the publication of his tract Oersted was elected a foreign member of the Royal Society and awarded the Copley medal. Efforts to connect magnetism with electricity had hitherto met with little success, and Wollaston, in his discourse as president of the Royal Society, referring to Oersted's discovery, expressed the hope that "the gleam of light which thus beams upon us may be the dawn of a new day, in which the clouds which have hitherto veiled from our sight the hidden mysteries of light and heat, of electricity and magnetism, may be dispelled." Oersted, who was the son of a country apothecary, originally studied medicine, but turned his attention to chemistry and physics while at Copenhagen University, and he held that position until his death in March 1851, at the age of seventy-three. Known alike for his genial and kindly nature and for his scientific labors, he was the author of some two hundred memoirs, and received many honors at home and abroad. Twenty-five years after his death a bronze statue of him was erected on the old fortification of Copenhagen.—*Science,*[1] September 24, 1920, pp. 288–9. From *Nature.*

* See JOURNAL A. PH. A., July 1918, p. 620, contribution by Edward Kremers, to whom we are also indebted for this reference.

[1] The *Christian Science Monitor* has a longer account of Oersted's discovery, but does not mention that his father was an apothecary.

MARK CENTENARY OF FIRST HIGH SCHOOL.

Pharmacy schools have a deep interest in the development of high schools, hence the following data are reprinted:

Philadelphia public schools this term celebrate the centenary of the establishment of the first public high school in the United States, the English High School of Boston, established in 1821.

Central High School, the first public high school in Philadelphia, was established in 1837. Since that time the growth of public education has so increased that the Federal Bureau of Education in its latest statistics announces that new high schools have been added to the educational system of the United States at the rate of at least one a day during the past twenty-eight years.

There are now more than 17,000 high schools in the United States, attended by 1,735,619 pupils. City high schools constitute less than ten percent of the total. They enroll, however, fifty-two percent of all the pupils. The number of high school graduates increased from 21,882 in 1890 to 224,867 in 1918. The largest high school in the United States is the Polytechnic Evening High School, Los Angeles, with an enrollment of 8,440. Philadelphia has twelve high schools with an enrollment of 239,514 pupils or a greater number than was graduated from all the high schools in the United States thirty years ago.

Texas, according to a compilation made by the Bureau of Education, Department of the Interior, leads all the States of the Union in the number of high school graduates who continue their education, either at some university or some business college. The figures show 48 percent of Texas high school graduates attend universities or colleges, while 60 percent continue their education at some institution of learning.

CENTENARY OF SIR JOSEPH BANKS.

The Centenary of Sir Joseph Banks, who died June 17, 1820, was commemorated June 17 of this year by the Linnean Society, in London, with a program of papers relating to Banks and his work and an exhibition of objects connected with his life. One of the papers presented was, the author stated, based on the daily use of specimens from Banks' herbarium, now in the British Museum. Sir Joseph Banks, Bart., was president of the Royal Society for 42 years.

CENTENARY OF THE RUBBER INDUSTRY.

The one-hundredth anniversary of the rubber industry, of which Thomas Hancock was the founder, was celebrated in London a few months ago. While the industry really became established in 1820, it has been only about twenty-five years since great strides therein have been made. The world's production of rubber in 1900 was 53,890 long tons; in 1919, 290,000 long tons. Last year the United States produced $667,204,000 worth of rubber products.

PERSONAL AND NEWS ITEMS.

Prof. C. O. Lee, professor of pharmacy at Purdue University for the last several years, has resigned, and sailed September 9 from Vancouver, B. C., on the steamer Empress of Asia, for Shanghai, en route to Wuhu, where he will open a pharmacy in connection with the Wuhu Mission Hospital maintained there by the board of foreign missions of the Methodist Episcopal church. His going to Asia is a distinct loss to the American Pharmaceutical Association as he has taken an active part in the annual conventions and was elected chairman of the Section on Commercial Interests at the Washington meeting.

His position in Purdue University has been filled by Frank Helbig of Chicago, a graduate of the Michigan University School of Pharmacy.

Dr. Robert P. Fischelis, consulting chemist of Philadelphia, is now located in the Foster Building, New York City. He is specializing on investigations of markets and sources of supply for chemical, pharmaceutical and biological products and the preparation of literature along these lines. He continues as a member of the faculty of the Philadelphia College of Pharmacy, and also as director of the technical department of the Matos Advertising Company. He has also been retained by the National Research Council to assist in securing the support of the chemical industries in the work of publishing an American volume of critical tables of physical and chemical constants.

Dr. Rodney Howard True has succeeded Dr. John MacFarlane as professor of botany in the University of Pennsylvania. As is well known, he was for many years with the Bureau of Plant Industry, Washington. He is a graduate of the University of Wisconsin, taught there for a time and also at Harvard University and Radcliffe College.

Dr. Frederick B. Power and **Victor K. Chesnut** have recently contributed the results of investigation on the "Odorous Constituents of Apples."* Although in chemical literature amyl valerate is generally designated as "apple oil," it is quite certain that this compound has never been found in the apple, and in the recent investigation no evidence could be obtained of its presence. On the other hand, the characteristic, fragrant odor of ripe apples has now been shown to be due to a combination of substances, essentially amyl esters of formic, acetic, and caproic acids, together with a small amount of the caprylic ester and a considerable proportion of acetaldehyde. These substances may exist in varying proportions in the numerous varieties of the fruit, thus causing slight differences in odor.

Allen J. Weaver of Dallas, Texas, has been appointed head of the Bureau of Food and Drug Laboratories of the Republic of San Domingo. He sailed October 12. Mr. Weaver will also have charge of the research work in developing the native drugs and vegetable products. He is a graduate of the University of Texas.

Fred West, formerly chief of the Customs Laboratory, port of New York, is now chief chemist of the new factory of the United Drug Company at St. Louis.

President Walter J. Sturgeon, of the Pennsylvania Pharmaceutical Association, has named the following well-known pharmacists as members of the special committee on prohibition enforcement: Edgar F. Heffner, Lock Haven, chairman; M. D. Allen, Philadelphia; I. G. Amsler, Pittsburgh; Croll Keller, Harrisburg; W. H. Knoepfel, Scranton. The creation of this committee was one of the interesting features at the meeting of the Pennsylvania Association held at Harrisburg.

Part of the twenty-first report of the Michigan Academy of Science is devoted to a highly scientific account of the flora of Michigan by **Oliver Atkins Farwell.** In the "Notes on the Michigan Flora" collected by Mr. Farwell, the order of the genera is that of Gray's Manual, ed. 7.

Ernest R. Jones, for the past three or four years dean of the School of Pharmacy, Detroit Institute of Technology, is now manager of a new Detroit concern, known as George M. Schettler, Manufacturing Pharmacist.

* *J. Am. Chem. Soc.* **42** (1920), 1509.

J. G. Munson, who had done business in one location at San José for thirty-one years, has sold his lease on the premises at 14 South First Street in that city. He has been a druggist forty-two years. Going to San José, he organized the San José Druggists' Association, of which he served as secretary almost thirty years. He was elected president of the California State Pharmaceutical Association in 1908, and has also served a number of years as a director in the College of Pharmacy, at the University of California.

A. L. I. Winne, one of the editors of the *Virginia Pharmacist,* is now secretary of the Virginia Pharmaceutical Association.

Samuel W. Fairchild has received from the King of Belgium the Cross of Officer of Leopold II, in recognition of his services in the organization of Belgian relief during the war. Earlier in the present year, Mr. Fairchild was made a Chevalier of the French Legion of Honor.

William M Sailer, of Sharp & Dohme, has been elected president of the American Drug Manufacturers' Association, succeeding the late Richard C. Stofer.

Carl L. Alsberg is now the president of the Association of American Dairy, Food and Drug Officials. **L. E. Sayre** was named chairman of the Committee on Definitions and Standards. Miami, Fla., was selected as the next convention city by the Association.

H. M. Gaylord has resigned the position of Assistant Prohibition Commissioner (U. S.); Captain D. Spencer Bliss succeeds him.

Tribute to Belgian Pharmacists.—A demonstration of the high esteem in which MM. Haazen, Pattou, Daminet, and Breugelmans, the leaders of the Nationale Pharmaceutique of Belgium, are held by their Belgian *confrères* took place recently, when a memorial plate was unveiled in their honor. This plate, which is a work of art, is to place on record the appreciation of Belgian pharmacists of the high sense of duty and patriotism shown by these gentlemen, and the great work they did for the profession during the German occupation. The memorial is to be placed in the meeting-room in the new headquarters of the Nationale Pharmaceutique in Brussels, and reproductions in silver were handed to each of the four gentlemen fêted as a souvenir.—*Chemist and Druggist,* August 28, 1920.

OBITUARY.

ALBERT M. ROEHRIG.

Albert M. Roehrig, for forty-one years in the service, died of apoplexy August 11, while on duty at the United States Marine Hospital, Savannah, Ga. He was the ranking pharmacist, having entered the service nearly forty-one years ago. During this period he was stationed at Staten Island, Ellis Island, Boston, St. Louis, San Francisco, Buffalo and Savannah, coming to the latter station about two years ago.

Mr. Roehrig graduated from the St. Louis College of Pharmacy in 1888, and was class-president. He joined the American Pharmaceutical Association in 1902, and frequently, since that time, was representative of the Service. He seldom missed a meeting and took an active interest in Association affairs.

ALBERT M. ROEHRIG

He joined the Masonic Order many years ago, and though his work compelled frequent changes he was elected Master of Klopstock Lodge, Staten Island. He was a Knight Templar and belonged to the Scottish Rite, and also to the Shrine. He was a life member of Hugh du Payne Commandery of Buffalo and received Templar burial by Palestine Commandery of Savannah at the request of the former. Mr. Roehrig made friends wherever he was stationed, and likewise in the Association. Mrs. Roehrig frequently accompanied her husband to the annual conventions; she now resides in Baltimore. Mr. Roehrig was 61 years of age.

RICHARD C. STOFER.

Richard C. Stofer, for fourteen years president of the Norwich Pharmacal Co., died after an illness of two months at the Norwich Memorial Hospital, September 10, 1920.

Mr. Stofer was born September 11, 1862, in Wilmington, Del., and was educated in Philadelphia. In 1882 he entered the employ of Keasbey & Mattison Co., leaving them in 1892 to become superintendent and chief chemist of the Norwich Pharmacal Co. Later on he was made vice-president, and in 1906 president, a position he held with honor to his company, and credit to himself, until his death.

In local civic and philanthropic movements he occupied a prominent place, serving from time to time as president or director of many organizations. He was also active in church and Masonic circles, a member of the American Chemical Society and of the American Pharmaceutical Association. In the broader walks of pharmaceutical life he was a figure of national prominence, filling, among many other offices, the dual rôle of president for two years of the American Drug Manufacturers' Association, and as president of Associated Industries of New York State.

Among the lesser offices to which he gave much of his energy and wisdom during the past few trying years, have been director and vice-president of the National Association of Manufacturers of Medicinal Products, director of the State Industrial Safety Council, member of the Advisory Council of the State Industrial Commission, member of the Council of National Defense, national counselor to the United States Chamber of Commerce, etc.

He was always prominent in advancing uniform and just national drug legislation. His natural qualifications fitted him to become a leader in the industrial world, and his close study of conditions, his sympathetic comprehension of the other man's viewpoint, his unfailing geniality and his democratic, unassuming ways earned for him the respect and good-will of leaders in industry everywhere.

By his own efforts he climbed to the pinnacle of his life's ambition, not only occupying a commanding position in the pharmaceutical world, but what was, to him, of far greater

importance—enjoying the respect, confidence and esteem of a nation-wide circle of warm friends.

Mr. Stofer is survived by his wife and two children, a daughter, Helen, and a son, Dr. M. W. Stofer, who is medical director of the company to which his father gave the best years of his life.

MAX J. BREITENBACH.

Max J. Breitenbach, president of Max J. Breitenbach Co., New York City, died at his summer home at Larchmont, N. Y., September 5. He was sixty-four years old. Two children, Julius and Mollie Breitenbach, and his wife, Jennie M. Breitenbach, survive him.

Mr. Breitenbach was closely identified with the drug trade throughout his life. His first business venture was in the retail drug trade. About 1885 he bought a drug store at 61 Bowery. Business flourished and he later added another store, this time at 591 Madison Avenue. The store still retains its name but long since has passed out of control of Mr. Breitenbach.

After graduating from the Newark High School, he entered the New York College of Pharmacy, Columbia University, from which institution he graduated with honors. Throughout his life he retained a real affection for his alma mater and served on the Board of Trustees for many years. The Max J. Breitenbach prize testified to his devotion.

The trustees of the New York College of Pharmacy, the Drug Trade Section of the New York Board of Trade and Transportation, the Proprietary Association of America, the pharmaceutical press—all were represented at the funeral.

Affairs of the company's business will continue in the hands of Emil Franke, for years Mr. Breitenbach's confidential man, and B. H. Ehrlich. The deceased was a member of the American Pharmaceutical Association and at the New York meeting took an active part in the entertainment of the visitors.

CHARLES ALBERT WEST.

Charles Albert West, vice-president of the Eastern Drug Co., Boston, Mass., and a prominent figure in the wholesale drug business, died Tuesday, September 28.

Mr. West was born in Boston on April 4, 1850, a descendant of Governor Thomas Dudley of Massachusetts. He attended the Chapman Grammar School, East Boston, and the Boston English High School, from which he was graduated in 1865.

On January 1, 1867, he entered the employ, as an office boy, of the wholesale drug firm of Reed, Cutler & Co. After a service of twenty years in positions of advancing responsibilities, he formed a partnership with Richard Jenney, Jr. On January 1, 1900, the Eastern Drug Co. was organized, this being a consolidation of West & Jenney, George C. Goodwin & Co., and Cutler Bros. & Co. Upon the formation of the Eastern Drug Co. Mr. West was elected its vice-president, which position he occupied continuously up to the time of his death. He was also president of the American Camphor Refining Co.

In the affairs of the National Wholesale Druggists' Association Mr. West was always a prominent figure, being elected as its president in 1916. He was a regular attendant at the meetings of the N. W. D. A., and while he served on many committees, his most important work of the association was that connected with legislative matters.

Mr. West was a member of various societies and organizations, and some years ago head of the Boston Druggists' Association and a trustee of the Massachusetts College of Pharmacy. He joined the American Pharmaceutical Association in 1892. He is survived by Mrs. West and one daughter, Mrs. Herbert L. Felton.

JOHN T. BENEDICT.

As we go to press, Robert F. Grace, chairman for Louisiana of the A. Ph. A. Membership Committee, advises us of the death, on September 22, of pharmacist John T. Benedict, of New Orleans. He was a loyal member of various druggists' associations.

RUDOLPH WIRTH.

Rudolph Wirth, secretary of E. Fougera & Co., Inc., died September 10, after forty-six years of business life with the firm mentioned. He was affiliated with the various Masonic bodies of New York City, a member of the Metropolitan Museum of Art, the Sphinx Club and the Press Club. Mrs. Wirth survives the deceased.

SOCIETIES AND COLLEGES

DEDICATED TO THE DELAWARE PHARMACEUTICAL SOCIETY, WILMINGTON, DEL., JUNE 7, 1917.

Presented by DR. ADOLPH W. MILLER.

"Pro presenti corporis et aeternae animae salute. Recipe:

Radicum fidei,
Florum spei,
Rosarum charitatis,
Liliorum puritatis,
Absynthi contritionis,
Violarum humilitatis,
Agarici satisfactionis,
ana quantum potes.

Misceantur omnia cum syrupe confessionis;
Terentur in mortario conscientiae;
Solvantur in aqua lachrimarum;
Coquantur in igne tribulationis; et fiat potus.
Recipe de hoc mane et sera."

HIGH SCHOOL GRADUATION FOR PHARMACY STUDENTS.

The American Conference of Pharmaceutical Faculties has appointed a special committee to work out methods for presenting the advantages of pharmacy as a calling to high school students, with Prof. J. A. Koch as chairman.

CHICAGO MEETING OF THE AMERICAN CHEMICAL SOCIETY.

The fall meeting of the American Chemical Society was a great success. A large attendance and a most remarkable program taken as a whole have made the meeting stand out as one to be remembered as a milestone of progress in chemistry. These meetings serve a double purpose, they are lessons for the future as well as records of what has been accomplished to this date. The members who attended the sessions had not only a week of enjoyable association with others in the same branch of scientific activities, but they had the opportunity to listen to some papers that showed the great advances made in certain departments.

This was denominated a "reconstruction session" with the announced purpose of "increased production through chemistry." The attendance was probably the largest in the history of the society, the registrants numbered about 1200, and in addition many of the local members did not register.

At the opening session A. S. Loevenhart of the University of Wisconsin spoke on "Chemistry's Contribution to the Life Sciences." He declared that every advance in chemistry was immediately reflected in medicines and their use for the treatment of disease. He asserted that chemo-therapy constitutes one of the greatest fields of endeavor for the chemist and physician.

The Division of Pharmaceutical Chemistry met Thursday in the botany lecture room at the Chicago University, closing with a symposium. The Organic Division met Thursday in the zoölogy lecture room. In each division there were a large number of carefully prepared and worthy addresses and reports of research, each being of prime interest to some group of attending chemists.

There is considerable discussion relative to the advisability of holding only one session annually, hereafter.

CONVENTION OF THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS IN ST. LOUIS.

More than 1600 druggists were registered at the twenty-second annual convention of the National Association of Retail Druggists. Legislation was the subject of principal interest, and ways and means for securing legislation and amendments of present statutes that will relieve the trade in the handling of regulated and restricted medicines.

A resolution was adopted urging amendment to the law which designates the retail pharmacist as a "retail liquor dealer." Efforts are to be made to have whisky standards restored to the Pharmacopoeia, and to have changed the present system of issuing treasury decisions so as to make them more understandable and less confusing to the retail trade.

An innovation in entertaining delegates was launched on the Mississippi River when Meyer Bros. Drug Company entertained the National Association of Retail Druggists with a Turkish Shenlik on the steamer St. Paul. The oriental affair, under the September moonlight, made the Mississippi appear as "sceptered in majesty and robed in mystery" as the Bosporus itself. It is reported that more than 3500 enjoyed the seven-hour hilarious trip into the Land of Ottoman. Oriental maids, howling dervishes, magicians and musicians filled every minute with entertainment. An epicurean feast was spread.

Dr. and Mrs. H. M. Whelpley entertained several evenings, informally, at their home, one occasion being largely attended by pharmaceutical editors. John T. Milliken & Co.

sponsored an enjoyable "get together" meeting in the auditorium of the St. Louis Chamber of Commerce.

The Association elected J. J. Possehl, Milwaukee, president; Elmer E. Chilson, Rochester, N. Y., first vice-president; A. W. Pauley, St. Louis, second vice-president; W. Bruce Philip, Oakland, Cal., third vice-president; W. O. Oren, Indianapolis, treasurer, and re-elected S. C. Henry secretary. J. F. Finneran, Boston, and J. A. Webster, Detroit, were elected members of the Executive Committee for three years.

FORTY-SIXTH ANNUAL MEETING OF THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION IN CINCINNATI, OCTOBER 25–29.

Plans have about been completed for the forty-sixth annual meeting of the N. W. D. A., at the Hotel Gibson, Cincinnati, Ohio, during the week beginning October 25th.

The Committee on Arrangements and Entertainment has prepared an excellent program of entertainment, including athletic and other diversions for associate members and the ladies during the hours when wholesale drug members will be in informal session on Tuesday evening and Wednesday afternoon. Full details have been given concerning the character and hours of entertainment features in the announcements of the Committee on Arrangements and Entertainment through the columns of *The Buckeye*, official publication of the committee.

Hotel reservations to date exceed 450, the largest number ever recorded for any meeting of the Association so far in advance. Hotel reservations can be secured promptly by communicating directly with Mr. Lee Wiltsee, c/o Wm. S. Merrell Company, Cincinnati, Ohio.

There are many important problems confronting the drug trade at this time, and it is President Bradley's earnest desire that the attendance, especially from wholesale drug members, be as representative as possible. Last year's meeting was attended by more than 85 percent of our wholesale drug membership, and it is President Bradley's hope that the attendance of such members this year will be 100 percent.

The Washington representative will be present during the convention, and it is also expected that an important official of the Drug Division of the Bureau of Chemistry, Department of Agriculture, Washington, D. C., will also attend, and will present some interesting suggestions on the subject of proper labels for drugs and medicines.

From *Bulletin* No. 29 we reprint the following important notice which is given to customers of a wholesale drug firm in making shipments:

1st. The shipment represented by this invoice has been carefully checked and rechecked, weighed before and after packing, *and gross weight marked on outside of bundle.*

2nd. The merchandise was carefully packed and delivered to the Transportation Company.

3rd. *They, not us,* are responsible to you for safe delivery.

4th. We will assist at any time in obtaining a just settlement, providing you carry out the following instructions:

SHIPMENTS RECEIVED IN "BAD ORDER."

1st. Before accepting shipment make sure package is intact.

2nd. If bundle, and paper are torn, case or carton broken, do not sign until the Agent has made notation "In bad order" on the receipt.

3rd. Then unpack at once, make note of the contents, send us a list of any items that are missing or broken.

4th. File bill for amount of loss or damage within 30 days.

In order that the carrier may have an opportunity to inspect goods and thereby verify claims, any loss or damage discovered after delivery should be reported to the agent of the delivering line, as far as possible, immediately upon discovery, or within forty-eight hours after receipt of goods by consignee.

We take the liberty of adding the following suggestion to above. In these times alcohol containers are apt to be tampered with. If the weight does not agree with that given by the shipper, less weight will indicate loss; if heavier, water may have replaced the abstracted alcohol. The specific gravity of the alcohol should be taken when received.

RESOLUTION ON THE DEATH OF PRESIDENT RICHARD C. STOFER OF AMERICAN DRUG MANUFACTURERS' ASSOCIATION.

In testimony of the high regard it entertained for its late President, Mr. Richard C. Stofer, the American Drug Manufacturers'

Association recently adopted the following resolution on his death:

"*Resolved*, That it is with profound sorrow that the American Drug Manufacturers' Association learns of the demise of its beloved President, R. C. Stofer, and that, while it offers to the bereaved family a sympathy that an appreciation of his lovable qualities makes heartfelt, it likewise offers them the consolation that is to be found in the thought that their beloved husband and father still lives in the good works he has left behind him, and in the cherished memories that his sterling manhood has instilled in all who were fortunate enough to know him."

(Signed) W. J. WOODRUFF,
Secretary.

SEVENTEENTH ANNUAL CONVENTION OF THE UNITED DRUG COMPANY IN ST. LOUIS, SEPTEMBER 29.

A brilliant commercial future for St. Louis was prophesied by President Louis K. Liggett, of Boston, Mass., in his annual address to the Rexall druggists and stockholders, numbering about 4,000, at the first day's session of the seventeenth annual United Drug Co. convention at the Coliseum last Tuesday morning. He also gave a comprehensive idea of what the establishment of the new $2,000,000 plant of the company which has just been completed would mean to the city and how the commercial development of the city would be affected by the successful operation of the industry, capable of producing $15,000,000 worth of goods yearly. He also told of what the company had accomplished in the past year and outlined the plans for the future.

WHOLESALE DRUG FIRM TAKES ENTIRE ORGANIZATION ON EDUCATIONAL TOUR.

A decided novelty in the history of the wholesale drug business was an "Education Trip" given by the Gibson-Snow Co. to their entire sales and organization forces, in taking them on a week's tour to visit large manufacturing plants at distant points. This firm organized the trip as the outcome and reward of a pharmaceutical contest, in order, as General Manager George B. Evans said, to post them on the manufacture of rubber goods and pharmaceuticals.

PHARMACY CONDITIONS IN GREAT BRITAIN NOT SO DIFFERENT FROM THOSE OF THE UNITED STATES.

J. Carroll Culbert, Council candidate of the Pharmaceutical Society of Ireland, said recently in an address to a retail drug trade association:

"I am deeply interested in the question of pharmaceutical education, both professional and commercial, and hope, with your assistance, to see such coördination between the shop, the laboratory, and the technical school that the pharmacist of the future will be as familiar with modern shop systems and organization as with scientific data—in a word, that he will take his place in the commercial community as a trained business man. Closer and more effective organization is demanded in the drug-trade to meet the menace of interested legislation forced on us from outside, while our desires for improvement are checked and smothered. There is more than a possibility of relief in the near future, if we are quick enough to seize the opportunity, from Imperial—or other—Parliament, from some difficulties and anomalies that now trouble us, such as unqualified dispensing in public and private surgeries; the status of pharmacy in the Army and Government services generally; the illegal and dangerous handling of poisons; the payment by members and Associates of the cost incurred in carrying out the Acts. These and other questions will need to be dealt with in the light of common sense and public interest. Finally, some means will have to be found to keep every chemist in business in touch with his fellows and with the Pharmaceutical Society."

LABORATORIES OF PHARMACY SCHOOLS IN EUROPE TO BE STUDIED BY CUBA.

Announcement is made by the U. S. Bureau of Education, Department of the Interior, that "Laboratories of schools of pharmacy in Europe will be studied by the professor of practical pharmacy in the University of Havana, Dr. Guillermo Diaz y Macias, who has been commissioned by the Cuban Government for that purpose. His observations will be reported to the school of medicine and pharmacy of the University of Havana."

Prof. Diaz is a member of the American Pharmaceutical Association, and translator of the U. S. Pharmacopoeia into the Spanish language.

CINCINNATI COLLEGES OF PHARMACY MERGED.

Cincinnati's two colleges of pharmacy were merged at a meeting by the faculty of the Queen City College of Pharmacy. Through this amalgamation the Queen City College, of which Prof. Caswell A. Mayo is the dean, will be joined with the Cincinnati College of Pharmacy over which Dr. Walter Griess presides. Arrangements have been made for the operation of the colleges at the building occupied by Cincinnati College for at least one year, after which it is expected that Cincinnati druggists will coöperate to find a more suitable home. C. T. P. Fennel of the Cincinnati College was unanimously recommended as dean of the combined faculties and will be appointed the manager.

CHANGES IN THE UNIVERSITY OF MICHIGAN COLLEGE OF PHARMACY.

Charles H. Stocking has been appointed Assistant Professor of Pharmacy to fill the vacancy caused by the resignation of Prof. A. F. Schlichting who has taken up his new duties as chief of the control laboratories of the William R. Warner Company of St. Louis. William J. McGill, holder of the Frederick Stearns' Research Fellowship, has been made Instructor in Pharmacy. Prof. E. H. Kraus is Acting Dean of the College of Pharmacy.

BUFFALO UNIVERSITY SCHOOL OF PHARMACY HAS NEW DRUG GARDEN.

The catalog of Buffalo College of Pharmacy shows the new drug garden, which is under the direction of Prof. A. B. Lemon; also a perspective view of the University of Buffalo and of the interesting event of breaking ground for the new chemical laboratory.

UNITED STATES CIVIL SERVICE EXAMINATION FOR DRUGGIST.

The United States Civil Service Commission announces an open competitive examination for druggist on October 20, 1920. Vacancies in the Public Health Service throughout the United States at $60 to $100 a month and maintenance (room, subsistence, and laundry); vacancies in the Internal Revenue Service, at $1,800 to $2,000 a year; and vacancies in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

Subjects and Weights.—Competitors will be examined in the following subjects, which will have the relative weights indicated:

Subjects.	*Weights.*
1. Spelling (twenty words of more than average difficulty)	5
2. Arithmetic (fundamental rules, common and decimal fractions, percentage, and their business application)	10
3. Penmanship (the legibility, rapidity, neatness, and general appearance of the competitor's handwriting in the subject of letter writing)	10
4. Letter writing (a letter of not less than 150 words on some subject of general interest)	5
5. Copying and correcting manuscript (test in making a smooth, corrected copy of a draft of manuscript which includes erasures, misspelled words, errors in syntax, etc.)	5
6. Chemistry, pharmacy, and materia medica	55
7. Training and experience	10
Total	100

Education.—Applicants must have been graduated from a recognized college of pharmacy. Statements as to training and experience are accepted subject to verification.

DEVELOPMENT OF THE POTASH MINES IN ALSACE.

The development of the potash mines in Alsace since the French took them over is already such that, according to a German authority, more than a million metric tons of crude salts will be produced this year, and the prospects are that the output will be largely increased. The reason for this increase is stated to be that while under German control a scheme of regulating the output was maintained in order to hold up prices. A recent report to the U. S. Geological Survey estimates the deposits of Alsatian potash salts as well above a billion metric tons, underlying an area of more than seventy square miles.

THE PHARMACIST AND THE LAW.

DRY ENFORCEMENT COSTLY.

The cost of prohibition enforcement already threatens to mount. The $4,500,000 which was voted by Congress for the conduct of the department last year is showing signs of depletion, and it is understood that when John F. Kramer, prohibition commissioner, submits his budget for the next year the money that he will ask will be nearer $10,000,000.

Events have proved that the prohibitionists underestimated the task before the enforcement division. The money asked will have to be approved by David F. Houston, secretary of the treasury, before it reaches Congress.

BUREAU OF MEDICINE AND SURGERY BARS WHISKY IN NAVY MEDICINE.

Spirituous liquors received their final and complete divorce from the United States Navy in an order made public September 8 by the Bureau of Medicine and Surgery prohibiting their issue to naval vessels for medicinal purposes.

Not only are medical supply depots prohibited from issuing whisky except to hospitals, but when their present supplies have become exhausted, the order states, "no further purchases will be made and whisky will be stricken from the supply table of the medical department of the navy. It is estimated the supply on hand will not last more than two or three weeks.

"When whisky is no longer available," the order says, "and a medical officer deems alcoholic stimulation absolutely essential for the preservation of human life, the ethyl alcohol obtainable from supply officers may be prescribed."

The order directs no further purchase from any source be made of "distilled spirits, wines, or alcohol preparations which are designated by the Bureau of Internal Revenue as being fit for intoxicating beverage purposes."

EXTEND TIME TO APPLY FOR LIQUOR PERMITS.

Time for the application for renewal of federal permits to prescribe and dispense liquor during the coming year has been extended to include November 1.

The last day for filing applications for permits for 1921 was originally set for October 1. Prohibition officers found they would still have time to complete records if applicants were given an extra month.

DEFINITION OF "INVENTORY AT MARKET" INCORPORATED IN AMENDMENT TO INCOME TAX REGULATIONS.

Treasury Decision 3047 amends Regulations No. 45 governing the income tax provisions of the Revenue Law of 1918 by revising the definition of inventories at market.

BOOK NOTICES AND REVIEWS.

Pasteur—The History of a Mind. Émile Duclaux. Translated by Erwin F. Smith and Florence Hedges, pathologists of the U. S. Department of Agriculture. This book is not only a critique of Pasteur; it is a contribution to biological history at a very important period in the development of science. 363 pp. Price, $5.00. The W. B. Saunders Company, Philadelphia.

The translators say in the introduction that in giving to the public an English edition it seems fitting to say some words respecting its author. They have been eminently successful in their sketch of Émile Duclaux, and after concluding this translation, which can have lost but little thereby, Mr. Smith repeats what Dr. Roux said of Pasteur after reading this analysis, "We understand Pasteur better and find him greater still;" the translator says, "We understand better both Pasteur and Duclaux." From the translators' Introduction the following is reprinted, because it estimates Duclaux and gives an estimation by the latter of Pasteur, and, of both, interwoven therewith, that of the translators.

Pasteur followed his idea as the magi their star. "He was a priest; priest of the idea," said his successor. In him instinct, or rather bold intuition, dominated reason. "Therefore," says Duclaux, "he saw a new vision, and justly." His disdain for traditional knowledge and philosophical speculations was scarcely concealed. Trusting only in experiments, he knew how to outstrip them and more than once went far beyond them. "That which puts him outside of comparison is the fact

that he loved great horizons, knew how to discover them and to make himself a part of them; that he saw at a distance and through the mists, more clearly than anyone else, the high summit he must attain to dominate the unknown and promised land. This was his rare gift and the secret of his power. But once seen he had wings to reach it, no more than we. One might believe, considering the originality, the simplicity and the unexpected in his solutions, that they were spontaneous and in the nature of happy discoveries. I do not know whether there ever are any such easy discoveries, accomplished without effort and by a sort of divination. Such surely was not the case with Pasteur's. If he was a discoverer it was first of all because he was a silent man and an obstinate one."

Duclaux's spirit was patient and methodical, but much less concentrated than Pasteur's. He discovered relatively little, but he excelled in understanding, observing and comparing. These qualities are strikingly evident in the *History of a Mind*. In the preface the author asks the question, "How is it possible to make the history of a mind?" He says Pasteur's scientific life had an admirable unity; "it was the logical and harmonious development of one and the same thought. Of course he did not know when he made his first studies in crystallography that he would end by discovering a means of preventing rabies. But neither did Christopher Columbus know when he set forth that he would discover America. He only divined that by going always in the same direction he would find something new. So with Pasteur."

This book is a history of a mind, of biology at a very important period in the development of science; it is a biography of Pasteur and an autobiography of Duclaux. As the story relates the history of Pasteur's studies, labor and discoveries, so the reproduction of photographs at various periods of the scientist's life gives us progressive pictures of him, and together with the writing of the author leads us almost beyond the realms of imagination and into the company of the great researcher at work. The researches of Pasteur concerned science and industry, and this extremely interesting and instructive book should have a place in every library.

PUBLICATIONS RECEIVED.

The following Theses, presented to the University of Paris, School of Pharmacy, for the degree of Doctor in Pharmacy:

No. 1. *The Coca of Java*, from a historical, chemical, botanical, and pharmacological standpoint. 111 pp. By Mlle. Emma Reens, University of Amsterdam.

No. 2. *The Salts and the Pastilles of Vichy*, historically, legally, and chemically considered. 265 pp. By Anton. Mallat, Vichy.

No. 3. *Contribution to the Chemical Study of the Milk from Moroccan Cows*—Cows' Milk in the City of Marrakech. 68 pp. By F. Weber, Pharmacist Aide-Major, 1st Class. In charge of Laboratory for the Repression of Fraud, Marrakech, Morocco.

No. 4. *Contribution to the Anatomical Study of the Root of Native Valerians*. 52 pp. By Pierre Mignon, Pharmacist 1st Class in hospitals of Paris.

No. 5. *Contribution to the Study of the Action of Formic Acid on Hexamethylene Tetramine*. 44 pp. By Frederic Ferrand, Paris.

No. 6. *Method of Micro-Chemical Research for Certain Constituents of Essential Oils*. 150 pp. By René Baudry, Pharmacist 1st Class.

No. 7. *On the Titrimetric Assay of the Alkalinity of the Blood*. 82 pp. By Francois Louis René Clogne, Pharmacist 1st Class, lauréat of the Academy of Medicine (prix Annussat, 1918).

No. 8. *Researches on the Copper Salts of the Animo Sulphonic Acids*. 66 pp. By René Demars, Pharmacist 1st Class in hospitals of Paris.

No. 9. *On the Thiosulphocarbamates and the Xanthates of Cobalt and Nickel*. 57 pp. By Louis Compin, Pharmacist 1st Class in hospitals of Paris.

No. 10. *On the Dioxylbenzylamines, 1-2-3 and 1-3-4*. 36 pp. By René Douetleau, Pharmacist 1st Class in hospitals of Paris, lauréat of the Paris School of Pharmacy (priz Buignet, 1910).

No. 11. *The Milk of Rouen—The supplying of milk to a large city during the war*. 142 pp. By Albert Guillaume, Croix de Guerre, Pharmacist Major 2nd Class, Chief of the Regional Laboratory of Chemical Examinations (III Region).

No. 12. *Assays of Pathological Urine in the Tropics*. 183 pp. By Joseph Khouri, Pharmaceutical Chemist, lauréat of the Montpelier School of Pharmacy. Expert chemist to the courts.

No. 13. *On the Cytology and Bacteriology of Acute and Chronic Blennorrhagia.* 95 pp. By Louis Julien, Pharmacist 1st Class, formerly chief of Laboratory, hospitals of Paris.

No. 14. *On the Morphology of the Bacillus of Tuberculosis, in Its Relation to the Polymorphism of Bacteria.* 149 pp. By Jules Phillipe René Cerbeland, Pharmacist 1st Class, Ex-Expert Chemist of the City of Paris. This paper is illustrated with colored plates.

Annual Announcement, 1920–1921, Wagner Free Institute of Science, Philadelphia. Charles H. LaWall is professor of Organic Chemistry.

NEW PUBLICATIONS.

Proceedings of the National Wholesale Druggists' Association. Forty-fifth Annual Meeting (being its tenth annual meeting as a corporation), at New Orleans, La., Hotel Grunewald, November 3 to 7, 1919. Contains many valuable reports of interest to the drug trade. Cloth, 600 pages.

Introduction to General Chemistry. H. N. McCoy and E. M. Terry. 8vo. 605 pp. Price, $3.00. McGraw-Hill Book Co., New York.

Laboratory Manual of Organic Chemistry. H. L. Fisher. 8vo. 331 pp. Price, $2.25. John Wiley & Sons, Inc., New York.

The Physical Chemistry of the Metals. Rudolph Schenck, translated and annotated by Reginald S. Dean. 1st Ed. 229 pp. Price, $3.00. John Wiley & Sons, Inc., New York, 1919.

Bastin's College Botany. Revised by William B. Day, professor of Botany and Materia Medica, School of Pharmacy, University of Illinois. G. P. Engelhard & Co., Publishers, Chicago.

Animal Fats and Oils: Their Practical Production, Properties, Falsification and Examination. Louis Edgar Andés. Translated from the German. 3rd English Ed., revised and enlarged, by H. B. Stocks. 315 pp., 76 illustrations. Price, 15s. Scott, Greenwood & Son, London.

Chemistry: Practical Chemistry: Fundamenta Facts and Applications to Modern Life. N. Henry Black and James Bryant Conant. 474 pp. Price, $2.00. The Macmillan Company, New York.

Colloids: Kleines Praktikum der Kolloidchemie. Wolfgang Ostwald and Paul Wolski. 159 pp., 14 illustrations. Price, $1.40. Theodor Steinkopff, Dresden and Leipzig.

Colloids: Les Colloides Métalliques: Proprietes et Préparations. Paul Bary. 95 pp. Price, 5 fr. 50. Dunod, Paris.

Glass: Le Soufflage du Verre dans les Laboratoires Scientifiques et Industriels. Henri Vigreux. 2nd Ed. 268 pp. Price, 10 fr. Dunod, Paris.

Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists. Superseding Bureau of Chemistry Bulletin 107, revised, and 1916 revisions published in *Journal of the Association of Official Agricultural Chemists.* 400 pp. 6 × 9. Price, $5.00. *Journal of the Association of Official Agricultural Chemists,* Washington, D. C.

Les Colloides. By J. Duclaux, Chief of Laboratory in the Pasteur Institute. 7 × $4^1/_2$ in. 288 pp. (Paris: Gauthier-Villars et Cie., 55 Quai des Grands-Augustins.)

OFFICERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1920–1921.

President—Charles Herbert Packard, 46 Maverick Square, East Boston, Mass.
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Treasurer—Henry M. Whelpley, 2342 Albion Place, St. Louis, Mo.
Reporter on the Progress of Pharmacy—H. V. Arny, 115 West 68th St., New York, N. Y.
Editor of Journal—E. G. Eberle, 253 Bourse Building, Philadelphia, Pa.
Local Secretary—To be elected. Meeting New Orleans, La., September 1921.
Chairman of the Council—Charles H. LaWall, 39 S. 10th St., Philadelphia, Pa.
Secretary of the Council—A. G. DuMez, Hygienic Laboratory, Washington, D. C.